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Lect: 05 Surgery

I have shown yt all yt bad symptoms in Dentition arise from yt incavation & erosion of yt nerves of yt Gum, covering yt surface of yt teeth, & hence I inferred yt propriety of dividing yt Gum as soon as there is an evident swelling of it. The division is to be made w! a sharp Instrument, & we are not to follow a very common practice of using yt nail to tear yt Gum, or scarring it w! a cauterised sixpence, nor are we to use yt common practice of giving Children bits of coral &c to hard substances under yt name of Gum stick. We have here followed yt instinct of nature for yey Children apply their fingers to their mouth, but we are not on yt account to introduce substances which tend to yt nervous & often bring on or add to yt symptoms. we are to make a crucial Incision, as a single incision does not allow sufficient room for yt teeth to get thro'. Now we may make one incision cross yt Gum w! a common knife guided by yt finger, but it is difficult to make it transversely, besides w! yt knife used for scarifying yt Gums, we are in dan-

ger

ger of hurting y^e. tongue, or cheek; as I have caused
to be made two steams or lancets, which I intend
to be concealed w^th. in y^e. mouth, then press down y^e.
lancet & make y^e. incision first in one direction
then taking y^e. other I make y^e. cross incision
w^th. out any danger of cutting more than I intend
to do.

2dly I have shown y^e. propriety of drawing
y^e. teeth of y^e. first set as soon as they begin
to vacillate very little force is sufficient,
you scarcely need more than a pair of forceps w.

3dly I have shown y^t. a clammy matter
sometimes grows upon y^e. teeth in very great
quantity, which has been called Tartar from
y^e. idea y^t. it is produced by y^e. acid part of
y^e. food remaining in y^e. mouth, as Tartar
is produced from Tartro Vinum. But it
is evident from comparing it w^th. y^e. concre
tions in y^e. ducts of y^e. salivary glands
y^t. it is solely from y^e. Saliva, as it is in
greatest quantity at y^e. roots of y^e. incisores
of y^e. lower Jaw, where y^e. saliva falls down
by its weight. When in substance then contains
nothing acid, nor corrosive acting as an acid

acid

acid upon y. earth of y. teeth, yet it is very hurtful to them, because y. power of it lodges y. saliva & other humours for a length of time, which therefore putrify in it, & it mechanically pushes away y. Gums from y. collar of y. teeth, where they have a close adhesion, & where y. roots enter y. princess part of y. teeth. We are therefore to take pains in separating y. Tartar, not allowing it to grow to any considerable bulk & y. by scraping it off w. steel Instruments for all y. powdery substances are unwary especially if there is any acid among them an Cream of Tartar, which corrodes y. teeth we use simply pieces of iron shaped to scrape y. teeth, or by y. points to enter between them, & we ought to make it a rule in time of y. operation, to apply a soft substance, as y. point of y. finger to y. teeth, to prevent y. uneasy sensation from y. instrument, & we ought to scrape them till they are smooth otherwise it breeds much more quickly all y. necessary Instruments are made to screw into y. same handle

We next proceed to y. disorders affecting y

y. sheild y. gum, or y. body of y. teeth. Some
of accidents to which from their office & situation
they are exposed, & y. bad effects which y. air &
food, laced wth various matters, must have
upon them, as they agree in structure wth y.
other organs, have a circulation thro, at least
a great part of them, had y. whole tunn
y. vectrel, y. membrane upon their surface &
y. pulp, as also lymphatic vessels, as y. lym
phatic glands swell when y. teeth are carious
may sometimes, after swelling, they break
& unless y. carious teeth be removed, it is
difficult to heal up y. ulcer. When we turn
not merely from y. sensibility, but from y. vast
of y. trunks of y. nerve, diminishing as it
passes thro y. bone, & y. threads entering y.
they are provided largely wth nerves, may
perhaps we cannot shew a nerve of y. same
size distributed to any other part in equal
proportion. To from all these circumstances
we it will appear y. y. teeth are subject
to y. same general disorders as y. rest
of y. body, to Inflam. & all its consequences, may we may go further & observe
y.

yt. ao some organs of yt. body are more yt. subject
to certain diseases than others, so certain diseas-
es at first seeming to affect yt. whole body, are
afterwards more particularly determined to yt.
teeth. Thus they suffer remarkably in yt. nu-
tulo, in yt. Scorbutus, frequently in yt. Venery
and yt. Pathognomic symptoms which is
a relation to yt. Gums, & yt. roots of yt. teeth
the Lues Venerea & its remedy. Moreover, es-
pecially yt. remedy, affect yt. Gums, we di-
tinguish yt. presence of it very readily by
yt. appearance of yt. Gums, & as we observe in
certain Constitutions a remedial generality
called a humour, as in yt. Gout falling on
yt. feet, we what is called a rheumatic
humour, no matter wt respect to yt. gen-
nature, or first cause of it, but yt. complaint
is ready to fix upon yt. teeth, so when
some persons catch cold, instead of its move
being affected wt catarrh, or its falling
upon yt. lungs, again is observed in yt.
teeth. Now where an Inflammation
occurs in yt. pulp wt in a tooth, as persons
will not be prevented upon, the pulp

suffer

ouffer upon (coal of) pain to heal it by y. Antiphlo-
giftic regimen, as they would in an Inflamm.
in other necessary to life, there is more danger
of y. Inflammation terminating in ossification
suppuration, whereby y. whole substance & nerves
w.in y. cavity of y. tooth are wounded, & for
y. most part y. tooth each beginning in y. inner
most part, there is an aching in y. tooth before
a caries is observed. But it sometimes happens
y. we observe upon y. tooth black spots
long before y. person suffers any pain, as
it would seem y. in some cases, y. caries
went from y. surface inwards, only
producing pain, when it reached y. pulpy
substance. From this circumstance a
rule has been laid down by Surgeons, y.
when such spots appear, they should
be immediately taken off w. y. file, ap-
plying y. finger to y. tooth when we use
it, & we ought to have a number of
files of different shapes, for this
may sometimes happen, as it is not
only possible y. a spot beginning on
y. surface of a tooth, may affect y.
neighbour

neighbourhood, & so spread, yet this seems a little doubtful & instead of laying this down as a general rule, it would be better to follow ye direct contrary, not to draw ye operation merely in consequence of a spot of a dark colour, For we have many instances where ye whole surface was black, & continued so for 12 or 15 years w.t out ye tooth mouldering away altogether; & though enamel of ye tooth is not primarily formed to defend ye porous matter from ye air & therefore from caries, as ye porous substance after ye separation of ye enamel continues to bind, yet heat, cold &c now affect ye tooth more violently, & ye air no doubt has a bad effect upon all bones, that have it has lost its arc of ye hardness, & ye supply being chiefly from within, so we are not to suffer a dentist to file down ye teeth, in order to make them more regular and beautiful, as in a few years such teeth are consumed.

I suppose ye a tooth has become carious

carious, yt. it gives pain yt. ye cause lies
reached ye cavity, in what manner are we
to treat it? If ye hole leading into ye cavity
be small, & but little of ye tooth is carious
we ought to save ye tooth, & to stuff ye cavity
wt. lead, or tin beat very thin, some use
Gold, but ye tin is to ye full as good. By
this we exclude ye air, a very principal
cause of ye pain; & hinder ye substances
whether solid or fluid to get in to irri-
tate ye pulp, & both heated in yt manner
have been found to last for many years,
suppose wch yt a tooth is much carri-
ed, if we have an choice, we must
extract it. But if ye patient will not
submitt, we endeavour to palliate ye
symptoms in various ways. We desire
ye general remedy by giving opium
hyoscyamus or Cymphon, which some
noted Dentists consider as preferable
to opium. Next we attempt to remove
ye pain by shocks given in different
ways, an electricall shock has frequently done this, we make it pass

thro

thro' ye affected tooth & ye pain in removed, on what principle I cannot tell. But perhaps we may explain it in some degree from ye next two obsects; & yt in ye burning ye cau: wt a red hot iron passed thro' a fistula, & ye aim I have in generally shewn, which is one of ye most sensible parts. How ye point hits this is done it may often succeed, but oftentimes it fails when ye patient discovers yt it is quite a trifling operation, it seems therefore best not by ye sudden surprize of ye mind, so in doing ye operation, we should endeavour to frighten ye patient as much as possible by shewing ye Iron, instead of concealing it. Next we lessen ye sensibility of ye tooth itself & certainly opium applied immediately to ye tooth has a greater effect than a much greater quantity taken into ye stomach, for thro' opium does not act so much & great dose's as many, when applied to ye nerve it will act in a topical way, & lessen ye power of ye nerve it touches, & these powers are again recovered, as when we apply it to ye muscles

of

of y^e. extremities, which agrein moves their juices so
this may be applied in practice to y^e. spasms
of muscles, but it would require many cases to
draw any fixed conclusion, Next we employ
substances y^t. affect y^e. nerves like opium &
perhaps act further by lessening their sensi-
blance, as ardent spirits, experience shows
y^t. these very readily allay y^e. pain, & y^e. spon
taneous also act somewhat in y^e. same manner
But if these fail & still y^e. patient will
not allow y^e. teeth to be pulled, we destroy
y^e. nerve by burning it w^t. a hot iron, or a
bit of caustic put into y^e. hollow touching
y^e. teeth w^t. point y^t. it may not spread
& y^e. pain attending this operation is not so
excessive as one might conceive at first
sight ~

Supposing next all these means to fail
or y^t. we have got a patient who will not
mitt to y^e. extraction of y^e. tooth, we may pro-
voke it a little, then put it down again
what some of y^e. French have called y^e. tur-
bation of y^e. teeth & which is frequently prac-
ticed in France, we thereby tear y^e. nerve

putting it back again it may gape dwell after
wards by y. metal either by continued repeti
tion of y. growth of a tractable & neatly fine
as before.

To do this, till of late years, we had no tolerable
Instruments nor have y. French to this day. that
they below, more pains than we do on y. manage
ment of y. teeth. Certain Horses were employ
which aided w. y. force of y. hand only. After
y. Iron Instrument was a good deal in use
called a Pelican, which is applied over y. teeth
& have a rest against y. cheek, & w. this
you draw it over. But there are two objec
tions to this Instrument, one is y. y. traction
is oblique against y. next teeth, & y. by
is y. it draws y. tooth too much over
without raising. Some have tried to remove
y. first objection by bending y. claw, but tho
you bend it 20 ways, it still draws in a
straight line between the rest & y. tooth. as
this Instrument is to be entirely laid aside
the first tolerable Instruments we have
& which now are in universal practice
are what you will find described

by

by my Brother in y^e. Mechanical Praxis of an Artificial
Intended for y^e. Teeth, it has a prodigious
power of Lever, & whilst we turn y^e. Teeth over
w^th. any particular action of y^e. Hand, we
raise it a little & so may raise it further
by y^e. strength & y^e. naturall motion
will also apply to y^e. Gummes, & y^e. two small
molares. The other Instrument y^e. Chirurgeon
is for y^e. large molares, by turning y^e. Iron
y^t. it, you Draw y^e. teeth over, & at y^e. same
time you raise it from the vertical more than
by y^e. former Instrument. Improvements
have been attempted upon this Instrument
some have thought y^t. y^e. vertical of y^e. teeth
was too much opposed, we have made it
not at a distance, but by this alteration
whilst one tooth is drawn inwards, anoth^r.
may be moved outwards, so we say y^t.
instrument wide altogether, if there was
any thing real in this objection. Another
Gentleman has made an Instrument
w^th. a good deal of ingenuity, where we act
w^th. y^e. two hands, & prevent y^e. tooth from
being turned too much on y^e. vertical.

But

not how both have complained, & yet they
in reality not so much to be regarded as might
be supposed for if you press upon the coetal
(as very little hurt, or should you be of
a different opinion, you may remove the objec-
tion by making the next incision a little
down upon the jaw. Another Gentleman has
altered the situation of this Instrument in
the mouth, viz. instead of putting the shorter
side, & the Claw upon the inside, by a
bend in the handle, we constitute it on the out-
side, & fix the Claw upon the outer, now this
brings us to a question, which of these two
situations is the best In the Lumbar vol
, between & especially in the Lumbar, there
is no choice, for as the Lumbar muscles
are in the Condyles of the Jaw, you can
fix the Instrument upon the outer side, so
that is an improvement with respect to these
With regard to all the others, Mr Hunter
alledges that the Instrument should be fixed
on the outer side, but I apprehend he is
not fully attended to the turn which the
teeth, muscles, & the effect this has upon
the

y. Axial. his idea in this that y. common Instrument (save y. bottle pully straighteners bending or twisting y. metal upon y. side towards which they are drawn, though it is rather y. other side which suffers, as y. axial part put in motion is y. weyght of y. metal, so his practice should be governed according to his own rules, & we should pull on y. inner side & y. B.d. Metatarsus is not placed perpendicular, but stands inwards, so y.t it will be at more readily if pulled outwards, so y. Axial Longe Metatarsi is to be drawn in y. same manner as y. two last. 11.ly regard to y. next I can not dispute y. point, especially at y. side where we would have him stand outwards. The other Instrument has scarcely been improved, y. Claw has been adapted to teeth of different sizes by means of a screw, but y. same purpose is answered by having two or three of different sizes, when we have a firmer Instrument we obtain hinge. The lumber hand to y. Turn-key is better than y.

Inner

Iron on, as sometimes more force is required than you would expect. The two Instruments here been put into ye same place & by means of a Catch we can turn ye Claw either to ye right or to either side.

In these Instruments we still use some new sorts of Forceps for lay them ye teeth is drawn side ways, & not lifted up from its socket directly. So Dr Higgins has contrived an Instrument to remedy this we grasp ye teeth wt a pair of Forceps ye Claws of which move upon a nail, by wch they have a perpendicular in order to make ye traction as straight as possible, then we introduce behind ye Forceps a piece of Iron which is flat below, & covere wt leather, & apply it to ye neighbouring teeth, & thus we lift ye teeth more directly than could have been done by ye other Instruments. I have tried another way, a piece of Iron is fitted for sliding on ye teeth at ye collar, then a bit of steel iron is laid down upon ye neck, leaving teeth to make a resistance, then

a

a pair of forceps is introduced, by opening
which we left y. teeth straight from the root
I shew you another Instrument, which a Gentle
man who attended here last winter, was so
obliging as to give me. It consists of a pair of
forceps for drawing y. teeth, & has a neat
screw which we turn it. This, Sirs, is y. w.
Mr Higgens Instrument, & still more ex-
actly w. this Scamaise y. Foreteeth very
accurately, & much better than w. y. common
Instruments. But y. backmost very sharp
corners are in danger of being cut when we
pull by y. sharp teeth of such Instruments
& there is also a want of room, that they
may be adapted to particular cases w.
advantage. I shew you another Instru-
ment brought from Paris, a piece of
Iron moves in a circle, which pipes y.
teeth fully, & at y. same time draws
up, while two pieces at y. side make
y. resistance upon y. next teeth.

I shew me have extracted y. two by
y. teeth, y. roots frequently break & remain
. how these may be taken out by a common

pair

pair of forceps when loose, or if those have not strength sufficient, there is no better Instrument than that of Mr Higgins's forceps, or the common key, which is bent a little & turned down at ye side of ye root, & where there are two fangs it is best to separate them, & even thus moving it with respect to ye posture of ye patient, some in all cases place him between their knees others on a chair, ye general rule is to place him on a low seat if you are to operate upon ye lower jaw, but if upon ye upper, he must be laid across a bed w.th his head over it, or he may sit on ye floor on a cushion w.th his head laid back between ye Surgeons knees the Gum must be separated from ye teeth w.th ye Instrument may be first used upon ye cutter, & it might also be of use to cut ye nerve, which is frequently broke, & that this is of no consequence, unless it is to a great extent, yet it would lessen ye danger of ye root's breaking, or a fracture of ye jaw, & less force would be necessary it is done w.th a sharp Instrument & a slight stroke of a hammer, I have said

sais if y. tooth is intolerable in ake, it should be pull'd
out but if it is much inflamed, & Discoloured
to one, as y. appears on is in danger of
being mortified from y. part, it may be un-
safe to pull it in an artificial way, but on
account of y. injury done to y. vessel, this is
hardly advisable; unless it be a sound tooth
& y. speech be hurt by y. want of it, & we
ought to tie it in w.t thread, & put w.t into
which have a bad effect on y. teeth. If y.
tooth not pull'd out, y. Dentists advise to
to y. gum, lancing them by syringe, but y.
(operating of these rather belongs to y.
Mechanic than y. Surgeon, as it is not
necessary y.t he should be acquainted w.t
y. manner of framing them, any more than
y.t he should know how to make y.
several Instrum.ts now shewn.

The Occasion of y. Tooth gum
their Vicinity frequently affect y. Antrum
Maxillare, which besides is exposed to
Occasion which originate in it. Also y.
Inflamma.n of y. Antrum ends in supe-
puration, & where y.t is y. case, we dis-

tinguish

maniest ye disease from ye toothach, by allay
ing ye cause of ye pain, ye convulance
& if ye opening from ye autumn into ye nose
is not shut, we can bring ye matter to fall
into ye cavity of ye mouth, & ye patient is able
to distinguish a bad smell in ye nostril.
but we often find yt ye matter have made
its way by ye roots of ye molares, & in some
cases it have broke out on ye cheek, or it
may make its way on ye inner side of ye
teeth in ye roof of ye mouth. In some cases
ye matter enlarges ye cavity of ye antrum
or ye whole substance of ye bone corrodes,
ye diseased gnaws past & swells out: now
as it is a rule to give discharge from
ye bottom of tumours we ought to do that
here; so if ye Molares are carious, we
draw first ye carious tooth, but if ye teeth
are sound & we are sure of a collection, we
may make an opening on ye outside of
them, & we are never to attempt it at ye
inner side on account of ye nerve & artery
which go down thro' ye palate maxillary
canal. If several of ye teeth are carious
&

& we have it in our choice we made proper y^e
bactamost molario but one, which is at y^e
very bottome of y^e Cauity, & y^e plate not y^e nut
is thin, but we may pull any of y^e large
molares, & even y^e first of y^e small, but
we are not to go further forwards, nor perhaps
y^e Antrum has an uncommon size. So High.
more speake of matter seeming yet out that
y^e vessel of y^e Sino Caninus, but I never
found it come so far forwards. Then making
y^e perforation, any common Instrument will
answer perfectly well, as a Shoemakers awl
that, or if y^e tooth is out, y^e spongy vessel
will let in a trocar, when we have y^e
advantage of a Cannula, which is of use
afterwards for making injections, we
exhibit in y^e Cure, by washing out y^e
purulent matter. An infusion of y^e
Cortex is very proper for this purpose, &
as it is troublesome to use y^e Syringe
every day, I have caused make a small
Silver tube w^t a plug of wood, which
needs only to be removed once in three
days, & y^e patient taking some of y^e
infusion

injection frequently into his mouth, & taking out ye plug, can wash it himself, & he continues this practice for 10 days or a fortnight till a considerable change is made upon ye disease.

Sect: 94.

We now proceed to ye other operations of Surgery, & in this part of ye course, I shall make it a rule first to explain ye changes produced by disease, which require an operation, w^th ye manner of distinguishing these, then I shall show you ye Instruments, & ye methods improved by ye most eminent Writers for ye cure, then from y^e considering ye structure of ye part, & ye alteration it has undergone, I shall endeavour to determine ye most fit method of operating & lastly I shall show you ye operation on ye subject.

I have sometimes thought of reducing operations into Classes, Orders & Genera; as is done w^th ye several diseases, but I find yt besides many difficulties yt occur here, we should often

after all reap very little advantage. they are so very different from one another, & it is sufficient yt. we reduce them under general heads, yt. bring under yt. same view, yt. similar operations that (though) different parts of yt. body, & similar yt. following Border &c. in describing first all yt. operations necessary to be done upon yt. Head, then those on yt. Thorax &c. which is attended with the less operations, or certain operations must be described but in yt. most imperfect manner. Shall lay down general rules for yt. several operations as for amputation, after those are understood shall proceed to yt. circumstances yt. are particular arising from yt. those of yt. part, & constitution of ye patient or nature. Now as this is all yt. we attempt it is not material where we begin, whether we go a Capite ad Calcem or reverse yt. order. What I find to be yt. most convenient is, first, after describing some few things necessary in almost every operation, to explain yt. operations yt. are done upon yt. Abdomen, including all others yt. resemble these, then to proceed to those done upon yt. Thorax, & to

Jemoth

ground w^ch then come upon ye abomination, & how
this ought ye we may get rid of ye subsequent
pains & ye object in view in as feible for the
most ye advantages are perfectly equal, & as
in most fractures ye Surgeon either finds
a wound, or is obliged to make one, I shall
before entering on any particular part, shew
ye method of treating wounded parts by

Suture if necessary, & compress &c.
Bandages & plasters are not sufficient
for ye purpose, Surgeons have recourse to ye
sewing of ye parts, three purposes ye dressing
of ye sore, which ye dressing is laid in
view, & ye ye whole or any of ye parts more
to be laid up, we take hold of ye Lips w^th one
hand, ye needle & thread w^th ye other & com
mence sewing ye whole or part, as occasion
may require, we make ye needle enter
together, & if it is to remain we form a
common knot, but if it is to be used ye pur-
pose of a Tourniquet only for compressing
ye vessels, suppose then we make a
running knot, which we can undoe at
pleasure. — 6

Sept^r

. but suppose ye mouth of a vessel prevents to
be after a leg or arm is cut off, & we may sup-
pose ye ye Ligature represents ye mouth
of ye vessel, because we close ye bleed: &c.
Ye first ye method which most readily
occurs to any ignorant person is ye best
i.e. to take hold of it w:th pair of forceps, or
common hooks, by which we can pull it out,
when we tie a thread about it in ye most
common manner, But instead of this me-
thod, ye most common practice is to turn
round ye mouth of ye bleeding vessel w:th a
thread, w:thout drawing it out, & to take
in some of ye flesh, or cellular substance
& many cases may occur where we are
soon necessarily obliged to operate in this
manner. Thus a vessel may pour out
blood, where we see ye place nearly
but not perfectly, or ye extremity of ye
vessel may be in a putrid state, or
sunk in ye flesh. But of choice shou'd
soon necessarily Surgeons employ ye
crooked needle, & ye thread ought to be
about ye size of ye needle, & ye two ends

two

to make it to be equal. He began on one side, & on y^e inside in semicircular wise can (beneath y^e innermost w^ch it, & inclining a second time nearly where we had it cut, we completed y^e Circle, & there is no reason why w^ch should only at once (besides y^e y^e Circle, namely y^e name & y^e compleat Circle y^e latter. Then we tie y^e thread & y^e ends very necessary in much less than does appear generally supposed. They take it to be a great y^t they include w^ch y^e artery a good deal. Effects. I can suppose y^e cavity of y^e uterus to be alone & can not scan matter a ligature would fill y^t. Scan nal cavity but not open y^e artery w^ch y^e ligature, y^e next of y^e coat will no readily give way. If tying an artery we make y^e most common knot, & it is scarcely necessary to add a second, to prevent y^e first from slipping, but it may be done if you choose it. But if you use to tie a ligature round a firm & elastic substance in order to stop y^e circulation in it, you would employ what y^e Surgeons call

cat-

all their kind of it you must pass y^e
thread twice this does not exactly we needle
name y^e other as a single one but after
it is drawn it needle more

Let suppose a membranous part
as y^e Mesentary canal, in cut & we are to
join y^e view of it, we would not use y^e
name as crooked needle, but rather a common
sewing needle, & we would join y^e parts in
y^e way, two lips of y^e wound close, just
like a letter, & repeat these turns in y^e most
simple way. But if you suspect as such
have m^t to Dean, y^t y^e Intestine is
so thin, y^t the sculture will not sufficiently
resist y^e expansion of y^e air m^t
in y^e gut, nor confine y^e food, we
may attempt to heal y^e wound in this
manner, which is this, you pass a
ligature (distant, a number of threads
as y^e straight needle, then take hold
of them on both sides, & draw them to-
gether, & twist them by which y^e In-
testine is shortened, & therefore y^e circu-
lation

lig made matter. But in y. name of y. Intestine, I believe y. most common method in y. text, for while y. thickness is increased y. cavity of y. Intestines is obstructed whereby y. faeces are in danger of being accumulated, & hurting y. Intestine, But would not employ in such a case what has been commonly done, y. method recommended by Celsus for curing wounds in general.

Let suppose a part of a moderate thickness is wounded, as a finger sometimes in y. lips, we join y. parts by a pin & round wound without a thread, then draw y. lips together by passing a thread over y. pin, repeating y. turns at pleasure, & we employ in a long wound more than one needle, & as many as y. length may render necessary.

Let suppose a very deep wound y. parts are wounded of very great thickness & without a retraction partly owing to y. inflammation which succeeds y. wound, partly to a muscle being divided transversely Now suppose a wound in y. fore part of y. thigh, & I shall make it clearing it

in

a y. most difficult to manage. A surgeon must always have in view that he first lay what bandages & proper plaisters will be, attending at y. same time to y. posture, if y. pieces are wounded bending y. part, if y. edges are opening it, but I must suppose y. y. Bandage is not sufficient & we must endeavour to retain y. parts, how is that to be formed? Sharp. If Dean &c direct to bring ye. parts near y. lips of y. wound contiguous, then to enter y. needles, middles, followed w. thread at an inch distance from each other, as y. wound is 4 inches in length, we are to make 3 stitches. Next we are to enter them at a sufficient distance from y. sides of y. wound. If Dean proposes y. distance should be nearly equal to y. depth of y. wound. Sharp reduces y. distance to measure, but it must vary according to y. depth, as y. retraction will bear a proportion to it. But in a deep wound we are to follow neither of them, for how can we make a needle enter at a distance equal to y. depth of y. wound, & bring

bring it out at y. opposite side unless y. wound be very long: & how do we know y. y. needle has passed at y. very bottom of y. wound, if it passes deeper it must wound y. parts underneath, if more superficial apart of y. lips will retract, & a bag of matter form, to y. best measure is this. If apart is not very thick, as y. skin of y. head & a large portion in all, y. stitching of it is of advantage at proper distances to keep y. skin in its place, while y. rest is secured by plaster & Bandages, & we may follow y. method of either of these authors, at once passing y. needle thro both sides of y. wounded tegumenta. But in a deep wound y. best rule is to lay y. lips of y. wound together, then to consider y. depth, y. number of stitches, & y. distance necessary from y. sides of y. wound & if it stands it must come out farther where y. flap is formed, & y. Surgeon takes open & note & marks y. place where they are to come out. Then opening y. wound & employing two needles, one at

at each end of ye thread, & enters ye one end from ye
hollow, & brings it out upon ye one side, then
he does ye same thing wth ye other entering
it from ye hollow, & bringing it out upon ye
other side. Then pulling ye needles into ye
posture in which it is to remain a violent
push ye lips together, & he ties ye knot drawn
ing it upon ye wound skin not upon ye lips
of ye wound, & after one he makes a second
wth ye new, & not unloosening it again for
ye matter which comes out entangles ye
thread so much yt if they are to be changed
ye ligature must be cut. If however there
is a probability yt in a short time some
alteration will be necessary you may form
it so as yt you may loose it again.
As to ye practice of pulling into a Linnen
rolled together between ye knot & wound
knots, & adding a third to them, it is a
more incumbrance, for ye pain is from
ye retraction of ye lips of ye wound, &
not from ye knot laid on ye wound skin.
Nor ye only other remaining Sur-
gure is where a wound penetrates into
ye

y. large Caution we ought y. Abdomen. In that case it has been thought y. a more equal support to y. view of y. wound was necessary to prevent Hernia from happening y. lips of y. wound being drawn in & opening left a discontinuance have been imputed to make y. lips of y. wound perfectly equal, wch. you pass y. threads, & then you draw y. lips together by means of rollers of plaster, wth a slit made in y. middle, which is called y. quill or Peg Suture. The threads is doubled & put in y. peg at one side, then taking hold of y. other two ends, you bring it down dividing y. threads & putting in y. other peg y. assistant presses y. lips together whilst y. Surgeon ties y. threads making y. knot to fall upon y. peg, & here we make a running knot, because y. peg being between y. wound & knot, we can loosen & change it. You Dam not altogether sure if this be preferable to y. interrupted suture, providing only y. you employ more threads than is commonly done, as it is any material y.

y. mould be clear accurately, as to explain y. air.

Villalmy

I shall not attempt to explain y. operations wch are practiced in y. cure of Generation in both Sexes, sequuina wch are very principal operation for y. stone in y. bladder. Nor I need add nothing to y. objections I made to Lithotomy or y. cutting a stone from y. cavity of y. kidney but I shall here round again y. different kind of calculi, wch require to which here are a number of things which require your attention. They differ very much from each other in colour, in consistence, some are more harder than others, kept y. chasse carries greatly, but when y. which is here y. stones are wth in y. cavity of y. bladder they resemble generally an egg pressed flat, or they have 3 different diameters length, breadth & thickness, & it is very material to know this, when you are about to extract extract them, so much delicate when y. catching y. stone in a favourable way, kept attending to y. surface you find

find that many of them are unequal & ye. angulities are often very regular, resembling ye. Crystals of salts, or there is a crystallization in ye. Calculi. Next we find ye. they have concentric lamella, & that these are seldom ye. same throughout, which peculiar deserves careful enquiry, for ye. lamellæ (i. e. send upon an unequal growth, & are occasioned by a variety of ye. constitution, or by a variety in ye. manner of life, ye. constitution remaining ye. same. Next where there are more than one stone in ye. bladder, we can determine that from ye. appearance of any of ye. stones for one makes an impression upon any of such stones are polished in certain places, & want ye. round figure which they otherwise readily take. In some of ye. stones ye. surface is very remarkable, & a great number can be put together so as to form a figure perfectly regular as I shew you 13 or 14 which formed two quite regular like ye. brass handle of a door, many have been divided as to ye. manner of ye. appearance, some appeared

prove that a large stone has been cut into as many pieces, while others imagine that a number of small stones by pressure have assumed that shape. How far latter is certainly true, for I have seen 3 stones two of which make a regular figure, & I can perceive that two such stones have formed by their, we see the time where they are joined, & on cutting the stone in a septum, where the two surfaces are connected, each having its concentrated lamellæ I formerly suggested that the formation of calculus might deserve upon a variety of causes a number of which might be very easily conceived, nowe are not to imagine that we can always explain it from the diet, or that it depends upon the kidney entirely. There may be many other circumstances, the absorbent vessels of the Animal may have great effect the intimate structure of the kidney, the nature of the general operations of the body, allowing a the water & absorbed parts to escape thro' the pores of the skin, the dilution, the time the fluids stagnate in the receptacles, the pressure of the body, the habit of retaining the

water

water, yt negligent manner of voiding it in
yt night time, particles of blood falling into
yt bladder, & attracting yt stony matter, so
thicken'd put into a solution of sugar, give it
yt appearance of Angulate, as in Sugar Candy, mean-
ing yt variety of these bodies then, we would
conclude yt a stone may have its first beginn-
ing in yt bladder of urine; & we are not al-
ways to look for yt descent of it from yt
pelvis of yt kidneys, tho this is very common
& we can frequently trace it by yt Symptts
which are very easily distinguished, & &
generally well described. When it has fallen
into yt bladder we endeavour to discharge
it by a proper posture of yt body, by relaxing
fomentations & Injections, by yt use of opium
to take off yt contraction of yt Sphincter
& by a proper posture in discharging yt
wind, as sitting on yt knees & leaning
forwards, to throw yt stone immediately
over yt passage.

Next suppose yt stone has for-
med in yt Bladder, or got into it, how
we are to distinguish it. There are a
great

great variety of matter, which enable me to con-
tinguish it w[ith] a probability approaching to certain-
ty. The patient finds always an uneasiness or
motion, he is perhaps tolerably easy when sitting
or lying, but on getting up to walk he feels an
uneasiness. Next generally he has a frequent
desire of passing water from y[e] irritation, in
consequence of which also he passes it in small
quantity. Next there is a difference in y[e]
colour of y[e] urine, it is generally of a paler co-
lour in tuberculous ones, which may (as I am apt
to think) arise from y[e] earthy particles, but like-
wise on y[e] affection being communicated back-
to y[e] kidney, just as y[e] colour of y[e] urine varies
in scorbutic ones. Next y[e] uneasiness is increa-
ased if y[e] motion is of a jolting nature, as
riding on horseback, or walking down stairs,
or passing. Two males that he has attended
he finds a great difficulty, y[e] irritation making
a spasmodic contract, or y[e] passing may be
mechanically stopt by y[e] stone falling upon
y[e] neck of y[e] bladder, so when he has nearly
emptied y[e] bladder, he relaxes all y[e] parts
y[e] stone are set at a distance to prevent it
y[e]

y^e. perſon, & y^e. urine becomes ſometimes, not from particular muſcles being irritated, but becauſe y^e. parts are then moſt relaxed. But ſtill on paſſing y^e. hand deepe y^e. pain is greatly increaſed, y^e. ſtone being brought more to y^e. neck of y^e. bladder, which is y^e. moſt ſenſible part of it; & he feels a pain extending to y^e. glans of y^e. penis, just as a perſon after amputation feels y^e. pain in y^e. toes, referring it to y^e. termination of y^e. nerves, not to y^e. middle parts which are irritated by y^e. Calculus. Then blood paſſes after violent motion being made, & ſometimes vary.

Blood, & aſcertain circumſtances induce it probable y^t. a perſon labours under Calculus but a Cancer or ulceration, or ſmall ſtone may produce nearly y^e. ſame kind of feeling, &c. before any operation be performed, it is neceſſary to ſound y^e. patient by introducing a probe into y^e. bladder.

I will ſuppoſe that in conſequence of ſounding, I am certain of y^e. diſeaſe, y^t. it is a ſtone, am I to truſt to internal medicines for y^e. cure, or to inſtruments made

into

into y^e blader? I suppose we are to trust to mir-
acles, nor have we clear proof y^t either have any qual
effect, at least not such as many Physicians seem
to conceive. I would allege y^t it is for y^e same
reason y^t by Caustic Alkali Lime water, Soap &c^a we can prevent y^e generation of
calculus. That is, suppose a person to eat for
y^e stone, & given proof of calculous disposition
& especially if there has been more than one
stone, we cannot promise y^t we can prevent
y^e return of y^e disease, & y^e reasoning upon the
subject is to be set aside entirely, it is not
worth mentioning y^e effect of y^e Caustic, tho
y^t it passes into y^e kidney, & mantling fixed
air drawn from y^e stone which in conveyance of this fills the pores & dissolves. For
y^e Caustic Alkali is soon changed in y^e
stomach & Intestines, where acids or accre-
ent matter is always contained, so it can
have no more effect than a Neutral salt
But I appeal to experiment, & there is not
a single proof to be adduced y^t we
possess a medicine of such powers, for tho
y^t we can lay any medicine dissolve alone
y^e

y^e inconstancie. this is alledged, & one cause in particular of this kind was published, but I know that there was a mistake. the stone was supposed to be dissolved, as it could not be felt, but afterwards another practicioner perceiving y^e patient into different postures, discovered it bona fide, y^t. cure was related as just, but Surgeons frequently do not by a probe discover a calculus, that is present. Neither would I have the injections made into y^e bladder, it may suspect that these should have been contrived, & Dr. Butler has contrived an Apparatus for y^t. purpose, it consists of a bladder, intended to be filled w^th. lime water & soap &c^a. & it is put between two Boards, by which y^e. patient can press out y^e. liquor, y^e bladders have two pipes fitted to it, one for y^e. male, & another for y^e. female, it is introduced into y^e. urethra, & in y^e. female it may reach y^e. bladder, as more room for pushing y^e experiment, but in y^e. Male it is attended w^th. pain, which at last comes to be quite intolerable, so that this practice can be laid aside, In y^e. female however if we could find

and proper remedy, we might by it, with much better chance than by any other way where ye stomach & constitution are at ye same time much injured, & I will venture to pledge yt if you were to take any given number of Calculous patients, suppose 500, & treat ye one half of them w.t Lithontriptic medicines, & ye other half perform ye operation, more would die of ye medicines, than in consequence of ye operation while not one of ye 50 perhaps had received a complete cure. Many of them might grow easier, but yt might have happened w.t out ye use of any medicines at all, owing to ye Bladder perhaps growing callous, ye coats becoming thicker & feeling less pain.

Oct: 9th

I can but mention I alledge that whether we consult ye nature of things, or appeal to experience, we are to learn from them any remedy which possesses ye power of dissolving stone already formed in ye Bladder, that we can't clearly show yt our remedies prevent ye generation of Calculi, & therefore as ye remedies commonly employed hurt ye constitution,

situation, Situation that of operation in y. last case, & this ought to be done early, for y. stone in y. bladder affects it in a way y. cannot be long without occasioning a contraction & thickening of its coats, y. whole gland may also come to be affected, & y. health suffers greatly, wch y. danger of y. operation is increased where y. patient has lodged long & y. Inflammation from y. operation & exposure to y. air, comes to be more dangerous. Must mention y. particular circumstances, by which we judge w.t a degree of probability, y.t a stone is lodged in y. Bladder but none of y. Symptoms are absolutely certain, so a Surgeon ought first to feel y. stone by a probe of a peculiar shape introduced w.t in y. cavity of y. Bladder, or y. patient might be wounded by introducing a probe called a Sound into y. cavity of y. Bladder the probe ought to be of y. most hard materials of Steel, Surgeons use a common Instrument made of Silver for drawing off y. water, but it is better to use a hard metal, which communicates y. tremor more sensibly to y. hand. The matter of y. Instrument not only

one

mouth, but we accumulate y. whole by y. passing
in y. Male. Now y. whole method of employing
this Instrument is perfectly simple, y. patient
is to be laid on a table nearly of y. usual height
w.t his shoulders raised a little w.t pillows, to
slacken y. parts, & to bring y. stone forwards to-
wards y. neck of y. Bladder then y.
Surgeon places himself before y. patient between
his knees, or he may stand on y. left side
if he be right handed. Now if you had never
seen a Surgeon do this operation, you might
probably introduce y. Instrument right y.
way, as y. probe is accomodated to y. passage
to keep it in that direction. But Surgeons
have got into y. absurd practice of turning
y. Instrument in y. reverse way, till they
can get it no further, when they make a
turn. Now this is attended w.t two disad-
vantages; y. patient suffers in turning y. probe
round, & y. Surgeon may in that manner
twist y. passage, especially if he appears
to do this w.t great dexterity, & turns it
quickly round. The Instrument ought
to be made warm, by keeping it in water
then

then inform it, or rub it over with some violence as Miller & Courage, for if this should happen if the Instrument get into y. Bladder, the introducing it y. two fingers ought to be opened, one passed in y. pocket with y. one hand, (examining y. penis upon it with y. other. There is always a contraction at y. neck of y. Bladder, caused by y. bulk of y. prostate Gland, & y. muscular fibres collected into y. Sphincter, & hence it is Surgeon feels a resistance, he generally introduces y. fore finger of y. left hand into y. rectum, as they say to raise y. point of y. Instrument, but y. in better done by depressing y. handle, so y. only use of this practice is, y. after we are within y. rectum we draw y. Sphincter of y. anus to us & stretch y. matter & make it straight, but y. first in not equal to what Surgeons of yeal, & y. principal rule is to work gently & to keep y. point in y. very axis of y. passage, for y. one of y. pocket may be pushing against a solid, after it is within y. cavity of y. bladder, he turn it round in all directions, & he is particularly to remember y.

y^e shape of y^e bladder, y^t in y^e adult body y^e
mouth of y^e urethra is not y^e lowest part of
y^e bladder, so y^t by turning y^e Instrument
backwards, he may strike y^e stone. But if
he still misses finding it he must introduce
y^e finger into y^e anus, y^t w^t y^e point of it
he may push up y^e stone, & you can generally
reach w^t y^e finger above y^e prostate gland.
If still y^e stone is not felt let y^e patient
alter y^e situation of y^e Body, stand up, lean
forwards, or sit upon his knees, leaning forwards
which brings y^e urethra to be y^e lowest part
of y^e bladder, & throws y^e stone upon it. If he
comes to subsist a hard substance, & feels
uneven, he concludes y^t then is a stone
but let him be cautious, for a few gravelly
sand may give y^t sensation, so he should
visit y^e point of y^e probe, & if y^e stone is
of considerable size, he feels it after moving
being some motion, nayone may be able
to guess y^e size of y^e stone from sounding.
Suppose then y^t he is satisfied of
y^e presence of y^e stone before he proceeds
to operate, especially if y^e patient has been
subject

subject to Nephritic complaints, & if. stone seems to have begun in ye. kidney, & to have descended into ye. bladder he ought to put ye. patient on a course of dilutent medicines, or some of those called Lithontriptic, in order to wash out small stones from ye. cavities of ye. kidneys, & he should attend to ye. season of ye. year, avoiding ye. extremes of heat & cold the practicity of ye. operation being determined let us now consider it.

Various Methods which Surgeons have attempted or practiced, & what I shall give you a general description of them, & after that, shewing what I shall prove to be ye. most fit, I shall perform it, & w.t out attending to ye. order of time, & shall explain them in a way yt. may be very easily understood.

(Before Anatomy was much cultivated in ye. days of Celsus, they attempted to extract ye. stone from within, by introducing one or two fingers of ye. left hand into ye. intestinum rectum, & pushing it. stone forwards, ye. patient being put in

in a proper posture for y. purpose either on y. knee of another person, & y. knees raised, so y. space between y. urethra & y. knees, y. Antichium y. Surgeon next made an incision directly upon it brought it into view, by a crucial incision, then it was turned out w.th y. finger, or w.th a sound. This variety as we are treating in this manner at random, cannot be what y. pain may fall between y. alone & togeather y.t method is not at all to be thought of.

Hermaeus a safer method was proposed after y. patient was full in y. proper posture & secured, a funnel'd probe was introduced, but little a way, but w.th a funnel, new skin was introduced into y. cavity of y. bladder, then y. Surgeon entered y. point of a double edged knife, or lancet into y. urethra, where it makes y. turn from y. perinæum to run up into y. bladder, or where we lead it, he then laid aside his lancet, & turn'd a bended probe along y. funnel'd probe into y. cavity of y. bladder & having now no further use for y. funnel'd probe, he took it out & introduc-

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ee mother Conductor upon y. point into y. bladder which was pushed at y. point in order to run upon it, y. one was called y. Male, & y. other y. Female Conductor, the next step in y. operation was to cut open y. passage towards it wide enough to allow y. instrument to enter, & y. next is y. manner of shewing two Conductors, y. Surgeon by separating those two open y. perineum so far on y. neck of y. bladder then introducing a pair of forceps along y. Conductors, & withdrawing y. Conductors you search for y. stone & extract it. This is called y. operation with y. gorget, or apparatus, & it is no doubt an improvement on y. former method, because we are so certainly to y cavity of y. Bladder; but we would not now think of following it, for first we lean y. parts incised of cutting them, & a laceration must of mate a more dangerous wound than an incision & we lean open more of y. urethra than is necessary, for y. opening would be equally large supposing half an inch had been cut, as when it is 11 inches y. urethra

are

are to be open. Some that neither by carrying an instrument fit as y. calling open y. urethra w.th y. knife (as still y. general Practice is) calling open y. Fistula, y. Fistula of y. urethra are cut & must be discarded.

In y. end of y. last Century a very material improvement was made in y. operation w.th y. great apparatus by Frere Jacke an Ecclesiastic. He proposed & practiced an incision into y. side of y. urethra, very near to y. bladder, as he introduced what is called on y.r account y. lateral operation & he continued y. incision thro y. neck of y. bladder, & then dilated it w.th y. finger & instruments, & this method with various improvements is now commonly practiced. But of late years, from our hearing of calling y. prostate Gland, & our being in danger of hearing y. (duct of y. testicle) seminales, while at y. same time y. opening is confined by y. Coats of y. bladder, it has been proposed to make an incision into y. bladder itself, between y. urethra

&

& ye entrance of ye Vrethra, wherby ye water & ye
bladder entirely. Tohen you ye Instruments for
yose for that purpose by Foubert a French Chi-
rurgion, as they have been joined together by Hous-
Thomas, we make an incision in ye skin w.th
a common Scalpel, then we make ye opening
between ye Anus & ye Scrotum, & ye Vrethra &
urethra, in ye very place which Tohen
appointed for puncturing ye bladder in ye
male, as nearly in ye place where we
perform ye common operation of Lithotomy
we then take his compound Instrument con-
sisting of a Lancet at ye point & in a groove
a knife, which we can regulate by ye Screw &
The 3d piece is a wedge like Instrument
which we call a Gorget, & which supplies
ye place of ye old conductors, Now that is
fixed to ye other two pieces, & ye Lancet is sup-
posed to be large enough to carry in w.th it
ye knife & ye Gorget. Suppose ye Lancet
w.th in ye bladder, I take hold of ye Gorget
in my left hand, & w.th ye right I withdraw
ye knife, by which I make a sufficient hole
in ye body of ye bladder, & leave ye Gor-

get

qel in ye bladder ready for conveying ye
this method Houbert practiced w.t success. But
in a few cases he failed, owing, as he alledg'd
to ye negligence of ye patient not retaining ye
urine. But w.t all ye precautions we can take
this method will never come into practice, for
it requires a considerable degree of dilatation
of ye bladder, whereas in Calculous cases of long
continuance ye bladder is very much contract-
ed, but neverthe a sufficient dilatation
of it, which may be known from ye quantity
of urine ye patient can contain in it, & therefore
at one time ye operation is rather too nice
for most Surgeons, who may hit ye bladder
perhaps in a wrong place. But suppose
ye incision made in a proper manner, ye
moment ye Surgeon draws out his in-
strument it collapses, ye urine & ye blad.
den slips away from ye wound of ye Integu-
ments & ye urine insinuates itself into ye
Cellular membrane, & spreads round ye bowels
in ye cavity of ye pelvis, & we ought to add
ye danger of making incisions & considera-
ble size in ye body of ye bladder, from ye

admission

(a mission of y^e^ int. (Besides there is room enough in most cases for y^e^ extraction of stones of very great size by y^e^ lateral operation, we (do not find in fact y^e^ y^e^ (ducts of y^e^ Vesiculæ Seminales ever are (ruined, & wounds of y^e^ prostate gland are not dangerous.

(Tis one more method only remains y^t^ I think needs to be mentioned, for (out of y^e^ question a project of some y^e^ cutting into y^e^ bladder at y^e^ side of y^e^ Intestinum rectum from behind, which is attended w^th^ danger & no advantage, to y^e^ only other & what (shall shew, is what is called y^e^ high operation, where y^e^ incision is made above y^e^ Os pubis directly into y^e^ body of y^e^ Bladder, which is, or when (distended much above y^e^ os pubis. First y^e^ Bladder must be (distended, some have proposed to do this by throwing in Injection w^th^ (some by means of a (Syringe but it is better to do it by lying upon y^e^ penis & letting y^e^ urine collect, may y^e^ patient ought to accustom himself for many weeks to retain y^e^ urine as long as possible, y^t^ he may (dilate y^e^ Bladder considerably, &

me

we judge whether y' intubation be sufficient by observing y' quantity of urine discharged, & by feeling y' fore part of it, for you may distinctly press it all round, providing you relax y' Abdomen properly, as y' straining in water would inconmode us a little, being blew in air. The patient is laid on a Table w'h y' shoulders low, y' y' parts may be fully on y' stretch, & y' Surgeon begins y' incision in y' very middle cutting from y' os pubis towards y' umbilicus, & his first incision ought to be of considerable length, perhaps 3 or 4 inches to give abundance of room, after dividing y' skin, I next cut thro' y' Cellular substance, then I separate y' recti, or Pyramidales muscles, which you know are sometimes wanting, I next meet w'h y' Cellular substance y' is on y' out side of y' bladder, then I am absolutely certain of going into y' bladder, & for that purpose I use a sharp pointed concave edged knife directing y' edge of it upwards, & putting y' fore finger of my left hand on y' back of it, which is y' surest Conductor

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& I can at pleasure dilate y. incision upwards or downwards. I then introduce y. forceps feeling for y. stone wt. my finger & readily direct y. forceps to it, lay hold of it & extract. How this will appear so very practicable, y. one really is prejudiced in its favour at first sight. yet it has, from practice, been almost entirely laid aside, & I have a strong suspicion that they have been right in doing so, tho' I cannot for want of data prove it, it has perhaps been done a hundred times in Great Britain, & I have a most distinct account of y. operation done in this way by y. late Mr. Smith of Perth, who cut more persons than usually fall to any one Mans share He had practiced y. lateral operation wt. success, seldom under 11 years of age & seldom in persons above 40, & one of 10 only died, in y. lateral way however he cut one time 92 Patients wt.out losing one, In this manner he performed y. operation 18 times & of that number 8 died, he had y. opportunity of examining y. patients after death, & he found y. bladder

y. urethra Vessels of y. Prostate in a state of high inflammation, & there is more danger than there can be of from Incision of y. body of y. bladder, where y. air or y. very freely, besides y. bladder instantly collapses, y. wound skins heal, & y. urine, where y. Inflammation is considerable, there is even a necessity of getting out y. urine this way, by means of a Canula, until it might y. Surgeon should know this way of doing this operation, but so far as experience yet goes, we return to y.

General Method, in all its steps & improvements, & first I shall give you a notion of y. Instruments employed. We begin w.t y. lying of y. patient, that done (do not tie) y. hands till after y. sounding is over which is sometimes y. most tedious part of y. operation, & generally when y. sound is fairly into y. bladder, y. operation is nearly done. So suppose y. body properly secured, & y. sounding performed, y. Surgeon next introduces a furrowed probe & endeavours to adapt not only y. Curvature

a child of stain & fat then y. transmewes
penio, men y. bowels out, w.t y. bellies
wibolance w.in. Iflew that y. Surgeon in-
troduces his finger at y. wound, & he can
distinctly feel y. staff thro' y. membraneous
& cancerous substances of y. urethra, but
he pushes down to y. part of y. urethra y.
is membraneous only, where he feels y. probe
quite thro' for that is y. part weought to
cut. The cut is to be made either w.t y.
same knife, or generally we take a small
knife. Then resteweth one w.t Dan
unsheed round it which is always bro-
bleame, & we can make a knife when
at y. point only With that Dam to open
y. urethra by turning y. edge towards y.
penis, & y. back towards y. bowels un-
reclum (dividing it w.t y. fore finger
of y. left hand, so that we are in no danger
of wounding y. reclum, & where that is done
y. operation is to be performed in a small
bungling manner. I say Dam so far from
apprehending any danger y.t I would pre-
fer one double edged at y. point, in order

to

to make an opening into y. membrane. If
wch instead of tearing y. passage wt y. blunt
Probe, we ought to cut open y. passage, & for
this purpose there have been various contriv-
ces, some do it wt y. knife, & we may cut very
well wt y. very knife wch wch we open y.
urethra, wt y. back turned towards y. fistula
But we ought to accommodate our Instruments
to all Surgeons, for if y. Surgeon is turned
& turns y. knife wrong, he may cut down
upon y. Intestinum rectum, as we should
endeavour to put this out of their power
An ingenious French Surgeon have
attempted this, he introduces an Instrum.
quite horizontally into y. hole in y. urethra
which has a groove in it (But there is
surely no need for y. Spirit level, which
is here added) then he takes a knife & enters
it into y. slit, & pushing it on to y. bottom
y. incision is made always in one di-
rection, & this is by no means a contempt-
ible Instrument, but Fevin have made his
cut so much backwards, we have however
better contrivances than this still. Here

is

in an Instrument of Iron (cont.) me under this knife, which we can regulate by turning y. handle, it is introduced into y. Funnel, & we thrust it into y. Bladder, then wt. drawing y. stuff, we open y. knife, pull it back again, & so make y. incision, & there [illegible] then in readily cut a navl number of patients in this manner, wt. great success, several hundreds & it must answer tolerably well but we have a still better Instrument y. invention of Mr. Cheselden an ingenious Surgeon in London which is y. shape & about an inch & y. side of y. Gorget & y. it cuts as we push it in. The advantage of this over there Instrument is that it makes way for itself, while here only cuts as it comes out, so may tear y. vesiculæ seminales, & y. anus dyscheria Now to it is, yt. as y. Gorget is to remain a considerable time in y. Bladder, in order to introduce y. forceps upon it's purpose a second or third time, wt. out any more scare y. bladder collapse, y. bowels fall down, or y. patient by his motion pushes them

them (even) y. bladder must open y. gorget
. Now that can be remedied w.t y. greater
care by keeping a blunt gorget to y. sharp one
in making a double gorget w.t a nail to keep
them together, & now we take y. blunt gorget
hasta about an inch, & holding him as one
monument, & enter y. sharp one into y.
bladder, making y. cut (vide) ways, & a little
upwards, whereby I avoid altogether y. vena
mal. duct as well as y. vesicula, & when y.
neck of y. Bladder is split, pull back y.
sharp gorget, & let y. blunt one remain w.t
safety. I need not detain you w.t another
monument of Le Cat, who makes a gorget
w.t a knife fixed to it, but this struck is
more unsuccessable than y. former &c.

After we have got in, we lay hold
of y. stone w.t y. forceps, & y. very best time
in y. next simple. The bladder & next
together, least they catch y. membrane of
y. bladder, they are made a little hollowed
& y. teeth near to y. point, & we make
y. forceps for common use straight, it is
alledged y. we need crooked forceps, where
y.

y^e stone is lodged in y^e portion of y^e bladder, which is behind the rectum. But they are never to be performed without absolute necessity, & I shall only think y^t a case will occur where, w^t an assistant putting a finger into y^e Anus we cannot feel it. It is true y^e inner coat of y^e Bladder, may push out between y^e fasciculi of y^e muscular fibres & y^e stone be inclosed there is another contrivance which too is unnecessary, after grasping y^e stone you turn this screw & fix y^e instrument to prevent y^e stone from being broke in extracting, but it is better y^t y^e Surgeon regulate y^e pressure upon y^e stone w^t his hands he takes hold of y^e Bladder of y^e Prostate w^t both hands & by introducing his fingers between them, he prevents them from pressing too much.

Now after having described this operation, you will readily understand y^e method of doing it, I begin w^t tying y^e ligature, I make a running knot upon y^e wrist, then I desire y^e patient to put his hand upon his coal, & I bring

one

one of yᵉ turns over yᵉ foot & yᵉ other under it, & one so again, at yᵉ other side, then make a running knot. I next bring yᵉ body over yᵉ edge of yᵉ table, raising yᵉ shoulders, & then introduce yᵉ staff which I give to an assistant, who takes it wᵗ his right hand, & turns it towards yᵉ Os ischium whilst wᵗ yᵉ left hand he supports yᵉ Scrotum, & other assistants manage yᵉ knees & feet. I now begin yᵉ incision yᵉ place of which is easily found, & this operation is really so easy, yᵗ I could do it in yᵉ dark as well as in yᵉ day light, because I am guided by yᵉ feel, & feel where yᵉ Cord & yᵉ penis join, wᵗ yᵉ urethra, & I am sure yᵗ yᵉ inner incision cannot go higher, but I may make yᵉ outer a little higher, thus I have heard of one case where yᵉ operator lay so high, yᵗ yᵉ testicle except out of yᵉ scrotum it is at advantage however yᵗ yᵉ first incision be 3 or 4 inches long, even when yᵉ stone is small, & in doing yᵉ operation yᵉ Surgeon is to study his own ease, he is to place himself as yᵗ his hands do not obstruct the French put one knee to yᵉ ground

yᵉ

appd a ligature in ye time of operation. ye matter
of ye next incision that ye transversall in penis is
perform'd, & dividing ye muscle of ye anus & ye
prepuce, & then cut thru ye bladder with ye
same small bladed instrum' pour out some blood
I have seen a necessity of latisfying these use
w'ch ye needle in some cases, we now feel
for ye staff, & turning ye knife towards ye mat
ye incision thru' ye membranous & ye urethra
& it is material yt we should divide ye mem-
branous freely, least our Instruments should
slip in ye substance of it, till we can ye staff
perfectly have, & there is room to admitt ye
point of ye finger. We now take Hawkins
Gorget, & introduce ye bullon of it into ye
Passage of ye prostat. Two Surgeons cannot
only take ye staff from ye assistant, yt
their two hands may cooperate, but it
would be better to let it alone, & to guide
ye Gorget w'th ye fore finger of ye other
hand into ye Groove, only ye assistant
must draw ye staff towards him, till ye
concave part presses against ye os pubis
whereby all ye parts are made stretch upon

y.e vulvide. Having thus introduced y.e Gorget into y.e bladder, we have no further occasion for y.e staff, so we w.th draw it, & enter y.e Forceps upon y.e Gorget, w.th which we search about for y.e stone. If you feel y.e stone at y.e neck of y.e Forceps, you move y.e leg, which is assistment, & if y.e stone is not raised sufficiently you introduce y.e finger into y.e anus, & you are to remember y.e 3d Diameter of y.e stone & not to grasp it fast, but to take a moderate hold of it, that it may turn round & y.e one present, & we may even afsist by introducing y.e finger, after you have got it to y.e proper direction, you turn y.e bladder towards y.e Os pubis & rectum to desend there, & pulling down we work very gradually, as in y.e delivery of a child, pulling downwards & backwards, because there is most space there —

Kept suppose y.t y.e stone has locked or y.t there are a number of small stones Surgeons generally only repeat y.e introduction of y.e Forceps, till they are all extracted, which is attended w.th great pain

pain; & y. patient in such cases generally dies
If y. stone have broke in passing, after y. Surgeon
has taken brought away y. larger pieces w.
y. forceps, for y. smaller we use a spoon, or
if they are numerous & very small, we wash
out y. patient's bowel or his bags, & introducing
a large pipe of a Syringe, throw up water &
fill y. bladder, clapping y. wound till
y. small stones have time to fall to y. bottom
whereby we may wash them all out at once
We then lay y. patients legs together, put some
dry lint upon y. wound & cover all a poultice
to asswage y. Inflammation, this keeps out
y. air, & sucks up y. urine, we have always
dressed w.t manifest advantage. The present
y. Clothes given being wet, you put a sheet
put below y. patients body, & some such
greasy substance may be rubbed upon y.
skin around y. edges of y. wound to prevent
excoriation.

Sect.t 98

In y. present way of performing y. Lateral
operation of Lithotomy, we have a
good deal to y. assistant in dividing y.

a rupture by the Instrument between y. Os pubis & y. groine being on y. back of y. Instrument we would rather make y. Groin on y. side of it, when y. assistant how merely to hold y. staff quite straight, & would not put out off y. left or blunt side of y. Gorget, which is in danger of tearing y. parts, as y. Vesicula seminales, on pulling it back. , but in order to be certain of going into y. bladder would make a large Button hole in y. groin which instead of being round may be made flat.

If y. stone have made its way into y. beginning of y. urethra, & have remained there some time & increased in size, we cut directly upon it, & if we feel it distinct we scarcely need y. direction of a staff, but if y. stone be very small, & it be fastened to be pushed farther forwards, we take y. assistance of a staff. If by touching it we can know it back into y. bladder, perhaps it would be better, as it may be difficult to lay hold of it in y. place after making y. incision. But we are never to use

force him, for if he has not arrived any length of time he will push it back with[out] doing material injury to y[e] neck of y[e] bladder. If you find y[t] a small stone, after injecting some warm water in y[e] bladder, how get [it] downwards a certain way in y[e] urethra & then stop, if you can't bring it y[e] whole length by pressing gently w[th] y[e] hand, y[e] patient at y[e] same time making y[e] effort of emptying y[e] urine (& we may [see] evidently that in some city matter, till y[e] urethra) it has been proposed by Lamotaini & Heister, y[t] we might introduce a hollow tube into y[e] urethra till we touch y[e] stone, then pass thro' it a pair of forceps, which open w[th] a spring, on y[e] on drawing back y[e] canula (y[e] forceps expand & you endeavour to slip y[e] bladder between y[e] membrane) & y[e] surface of y[e] stone) then you push down y[e] canula to grasp it & endeavour to extract. How I am doubtful if you will be often able to succeed w[th] this Instrument, if you can afford nearly as much by y[e] pressure on y[e] outside w[th] y[e] hand, & you are in neither way to use much force, as y[e] fric-

tion

not will have me a natural in me than by
y. only remaining way, by an incision. In making
this, reasoning merely upon it, we would
think it best to cut directly upon it, making
y. opening in y. skin, & membrane of y. ure-
thra at y. same place, but when y. stric-
ture retracted, y. urine should get out under y.
skin, & be diffused, yet experience shows y.
this last is a safe, & so evidently y. best
method of operating, so we draw y. skin
strongly forwards; then cut directly upon y.
stone, & turn it out w. a probe, then we
allow y. skin to slide back again, which
confines y. urine, or should it get out
we wipe it by y. profound of y. hand, if
yt. still is insufficient, you may inje-
duce a bit of flexible catheter, & if all fail
y. last remedy is y. making y. incision
of y. skin directly opposite to y. incision
in y. urethra, & y. patient is in no worse
a situation. ---6

So I have got a fresh subject, yt.
I may operate upon y. Eye in y. most con-
venient situation possible, I shall next pro-
ceed

are to y. speculum for y.

Cataract by which is meant an opacity in ye pupil of y. eye which we easily perceive, & which we find is in y. case of a Gutta Opaca in y. body of y. Crystalline Tunica, In some few rare cases, y. Capsule of y. lens grows opaque, & I have known of two cases where a thin film grew from y. Iris, covered a small part of it, & extended across y. pupil The Cataract sometimes begins from external accidents, as from a blow upon y. eye & where it begins in this way, we observe y. a little time, & y. concealing y. eye from light is sufficient to remove y. complaint, But generally this Cataract comes on very slowly & in y. most equable manner in both y. eyes at y. same time, in other cases we observe it in one eye only, & instead of affecting y. whole body of y. lens, I have observed it begin in a number of points which extend, & unite, till y. whole lens appears of an uniform consistence, In some cases even where y. Cataract comes on very slowly

me

we observe a whiteness, especially resembling
y. colour of y. milk, & where an operation is
we sometimes find an inequal consistence
in find a quantity of y. same humour, which
is more readily on y. surface, between y.
capsule & y. body of y. lens, y. lens being na-
turally much softer on y. outer side than
in y. middle, wherefore it seems a more just
picture than we can imitate by art. But
I have seen y. whiteness go thro' y. whole body
of y. lens, & y. whole substance of it rather
softer than is natural. But in 19 cases
of 20 y. lens becomes of a yellowish colour
resembling Amber. I have seen several
hundreds of diseased lenses in y. profession
of Baron Wenzel, & by far y. greater num-
ber of them were of such a colour, & am
certain yt all he showed me had been di-
seased, for when we dry y. lens from a
recent subject, it has a very different
colour. This colour I have compared to
burnished steel, but it is more of a yellow-
ish brown colour.

Now are we to imagine y! same

(diet

(cico cum remove y^e (disease, or what remedies
are we to attempt to cure it by? . Mercury
has been often tried, but for y^e most part to
very little purpose, & late years y^e Cicuta
& still later y^e pulvatilla nigricans. Now this
last we have had necessitously of buying
in this Country, it' professes a singular pro-
perty of affecting y^e eyes in a sound person
a small quantity being taken into y^e sto-
mach; But from attending to y^e progress
of y^e Cataract, & observing what happens in
ye Animals, as well as an appeal to
experience, there is reason to doubt if we
can make much change in it, for in all
ye animals it' gradually contracts y^e same
kind of colour' & consistence as in y^e Ca-
taract', & where it comes on equally in
both eyes, it is more a failure of y^e par-
ticular part of y^e Constitution, & it' is as
difficult to prevent it', as to prevent y^e
failure of y^e whole. I can not how-
ever y^t any reasoning of this sort should
prevent y^e proper trials, only we would
avoid any remedy y^t would hurt y^e
patient

patients Constitution.

Suppose then y^t we are under y^e necessity of having recourse to a Surgical operation, before we undertake y^t we ought to be well assured y^t the disease is confined to y^e lens, & likewise all other circumstances w^ch respect to y^e lens & eyes in general. First let us be assured y^t y^e bottom of y^e Eye is sound, & y^t y^e only fault is y^e (dark substance) interposed, or let us suppose y^t y^e Amaurosis, or Gutta serena, y^e insensibility of y^e optic nerve & retina (as not accompany y^e Cataract, for they often go together) there are many instances where an Amaurosis has continued for a number of years, & y^e lens was clear, but generally y^e Amaurosis is succeeded by Cataract, one part of y^e Eye being affected, y^e other readily partakes w^ch it. Now you will recollect a fact y^t all y^e light which strikes y^e retina passes thro' y^e lens, & y^t there are no spaces between what are called y^e Ciliary processes & therefore that y^e motion of y^e pupil, or contraction of y^e iris, be inconsiderable, y^e bottom of y^e Eye may not be insensible to

(the

To ascertain this point we are to compare together
y^e^ opacity of y^e^ lens, & degree of motion in y^e^
pupil, & to observe if y^e^ diseased eye have a
tolerable degree of motion, when y^e^ other is
shut. For you recollect y^t^ our pupils sympa-
thize, so y^t^ there may be a complete Amau-
rosis in y^e^ left eye, yet if y^e^ right be sound
there will be in y^e^ left a considerable mo-
tion of y^e^ pupil, for when y^e^ irritation is made
upon y^e^ right eye, y^e^ motion is communica-
ted to y^e^ other. We turn to y^e^ right then my
y^e^ eye which is diseased, & if we perceive
a tolerable motion in it, & y^t^ y^e^ patient has
not formerly been subject to headache, nor
paralytic weakness in other parts, we may
conclude y^t^ y^e^ bottom of y^e^ eye is in a tol-
erable state. Next you will attend to y^e^
parts of y^e^ pupil, for y^e^ bottom of y^e^ eye may
preserve its power & yet y^e^ lens may have
contracted preternatural adhesions w^t^ y^e^
Iris, so let us see that there are no mem-
branes connecting them. To do this we turn
y^e^ eye to a strong light, & an obscure
light by turns, observing at y^e^ same
time

time of the shape of the pupil, & if there are any adhesions, we will be able to discriminate that the regular circle of the pupil is altered that on its moving, one part remains fixed & the other dilates, but, if it all shuts in an equable manner, there is no adhesion. There is one caution further to be given, viz. is, if that the disease be confined to one eye, we ought not to argue the ought of the other by doing any operation, but that we could by a union remove the cataract, the patient receives very little benefit, for he cannot apply both readily to the same object, or adapt glasses to them readily so we only are to operate when both eyes are affected.

Supposing then that we have found that the bottom of the eye possesses the power that there is no adhesion & both eyes are affected, before we undertake any operation, we ought to consider the patient for sometime to obviate Antiphlogistic Regimen, for the consequences of the operation are sometimes greater than one

one would expect, & y. Inflammation often ensues y. puncture of y. operation. He next alleges to y. manner of operating, & y. operation consists in y. mechanically removing y. cataract from y. pupil, or axis of y. eye, which may be done in two ways. The most antient is to thrust a needle into y. eye, & to push y. body of y. Crystalline lens away from y. axis & to lodge it at y. bottom intangled in y. vitreous humour, & this is called depressing or couching of y. Cataract. But as y. lens frequently starts up again from its place, & y. operation needs to be repeated, while every after attempt is attended w.th more difficulty than y. first, of late years instead of depressing, it has been practised to extract y. lens to take it out of y. eye. Perhaps accident more than reasoning led to y. attempt, but y. first person who pointed out distinctly y. method of doing it is Mons.r Daniel, about 20 years ago, & I shall begin w.th shewing you his method. W.th y. finger y. eyelids are drawn asunder, & y. ball fixed a little, an assistant supporting y. upper eye-

lid

viz. the Surgeon placeth himself before ye patient & ye assistant behind him, then he takes a common pricker in a handle, & ye stalk of it bent a little, & makes an opening in ye lower part of ye Cornea. Then he introduces a blunt pointed double edged knife, w.th which he enlarges ye opening, cutting sideways, first w.th ye one side, then w.th ye other. Then he introduces a pair of crooked scissars, having their Curvature adapted to ye.t of ye Cornea & w.th these he continues his incision, in order to separate ye lower half of ye Cornea from ye Sclerotic. Then he lifts ye flap of ye Cornea w.th a blunt spoon, & makes a moderate pressure upon ye ball of ye eye turning ye Capsule of ye lens, & he introduces a needle thro ye pupil, & cuts ye Capsule, then making a moderate pressure he pushes out ye lens. Now this method it is evident requires ye. ye. Instruments should be very dexterously put in & taken out from ye eye, it appears complex & tho it may be executed w.th tolerable safety I apprehend we have other methods

methods y^t are more simple & preferable.

I omitted this method was published in y^e French memoirs, some of y^e French surgeons & soon after Mr Sharp, shewed y^e possibility of doing y^e operation w^t one knife, w^t this they separated y^e lower half of y^e cornea & introducing y^e point of y^e knife at y^e middle of y^e cornea on y^e outer side, & pushing it to. lucem y^e Cornea & Iris, they brought it about at y^e other side, then bringing it downwd. they separated y^e Cornea.

Still later a most dexterous oculist Baron Wenzel, has practiced y^e operation w^t a lancet, blunt on y^e back, & hematites his incision exactly in y^e manner now described, w^t out using any particular instrument to confine y^e motion of y^e eye, for for y^e want of such an instrument y^e operation is not to be executed w^t tolerable ease, & Dessaulx says y^t a very great improvement has been made by an Italian not now in town. Mr Millar. He had formerly contrivances for opening y^e eye lids, & keeping y^e ball of y^e eye, one

ne painted by Sharp, wt a spring, but this may
open wt too much, or too little force, so we
prefer yt invented by Millar, which consists
of a circular piece for taking in more than
yt cornea, & we have them of different sizes
We apply such a circle then to yt fore part
of yt eye, it turn a bent blatta coming from
it, which keeps down yt under eye lid, while
yt upper eye lid is received into a groove
after piping yt eye by means of it, we
make our incision wt such a Lancet
Sharp used, but smaller, on yt outer side
of yt sclerotic, & a part of yt circle of yt oper
culum may be left incomplete, yt we
may remove it, if we choose, before we
bring out yt lancet, followed in Mr
Lobs operations, yt he made ye pagen
nule, after making yt Incision, to in
troduce a bit of steel, rough at yt point
shun yt pupil, & wt it tore yt membrane
of yt Crystalline Lens, after which he
made a slight pressure upon yt ball of
of yt eye, & I have no doubt yt yt success
of his operations depended in a great mea
sure

vere upon this, for if without this we make our
incision in an irregular manner, we shall
of posterior Capsule, as well as of anterior
Capsule of y^e crystalline humour will be divided
ed, may in one case where there was a consi-
derable resistance, owing to thickness
of y^e Capsule, be introduced a small Lancet
edged in a Canula, which reaching y^e cornea
then pushing it into y^e eye, he allowed it
by y^e spring to fall back, & so the one end
of y^e instrument on wood, & we shall not
lay them.

Before we begin, we must be careful
to put y^e patient & ourselves in a proper
posture. Heister was particularly attentive
to this, y^e patient was seated upon a chair
of y^e common height, then he seated himself
before y^e patient, but a little to one side, ac-
cording to y^e eye upon which he was to
operate, he then put his foot on a stool
of such a height, y^t when he rested his
elbow on his knee, y^e hand was of y^e
same height with y^e eye. You ought
to have some roller, wool than any lint
we

we may ord ye patient in a clear chair, or stand ord
ab ye side of a table, yt ye Surgeon alone may
read on yt table, we then fix ye Speculum to
ye eye, putting ye inferior eye lid into ye groove
yt is made for it, & it is impossible for ye
eye to move, nay ye rude touch of ye speculum
inclined of making ye eye move upon it, brings
on a contraction of all ye muscles, just as when
we irritate ye nose slightly a person sneez-
zes, but if we irritate it more rudely
wt ye like &c. yt effect is not produced, either
ye patient are not disposed to move in yt manner
or there is such a motion of ye whole at once
yt ye eye remains more into place, But
ye Surgeon touch to ye prefound wt my knife
I then take ye lancet in my right between
ye thumb & two first fingers, & rest my hand
upon ye patients cheek, & enter ye knife
near to ye edge of ye cornea keeping to ye
clear part, yt I may save ye iris, & pre-
vent an effusion of blood, therwise ye nea-
rer ye better, because we know ye cicatrix
more to ye side of ye cornea, I have made
ye section somewhat like a wedge yt

it

it may fill up y. hole & prevent y. aqueous
humour from running out so quickly, then
carrying y. knife across. Thirdly if out of
y. other side, when immediately before using
pressure, but still keep y. speculum there.
Next now turned y. patient back to y.
light, but it is better y. assistant
should hold his hand before y. eye. I can
now by pressure on y. eye bring out y.
lens, but a skilful operator will do better
in first introducing a blunt probe to scan
y. capsule, at y. same time his assistant
gently instrument in y. hand of next
operation, & may considerably injure y. iris
or other neighbouring parts, so y. per-
sons such operators as have not much
experience in this operation, had better
content themselves with making aqueous
ble pressure on both sides of y. ball of y.
eye, at y. same time while bringing
y. lens out, we cover y. eye from light
as y. iris may not contract, & more room
therefore be given.

After y. extraction we apply a probe
into

ings merely wt ye view of excluding ye air which have a remarkably bad effect upon ye eye. we intend of changing ye dressings, in order to give something of a healing & antiphlogistic nature into ye eye, we pulverize'd alum & blew vitriol over ye whole. By happening ye cloth wet wt new water may be of service, & we may throw a little on ye cloth from time to time. We keep ye patient in absolute darkness concerning both eyes, till all pain & inflammation are gone, & ye wound completely healed, ye 10. or 12. days. For tho' ye operation had been properly done, yet in very little time a darkness is frequently formed on ye eye, probably in consequence of inflammation, & you know ye iris is an organ of great sensibility, having red blood circulating thro it, & there are sometimes lymphi produced & remitted We next attend to ye way of

touching a person, which has been long practiced, & yet no operation in Surgery is more misunderstood & less understood. it ought to be executed by plucking a needle into

the y. eye, thro' y. Selerotic coat, and tenth
an Inch behind y. side of y. Cornea, where y.
opening of y. Eyelids leave sufficient room
it is divided thro' y. nitrous humour to
y. side of y. Crystalline lens, which y. Surgeon
endeavours to push down to y. bottom
of y. eye, the needle commonly employed
is shaped like a Lancet in y. point & is com-
-monly thicker than a common sewing needle
so it is difficult to know whether we
are to get above y. lens, & press it down at
y. flat side of y. needle, or if we are to lay
hold of it. But some of these needles
are made with a blunt needle going along
w.t it, & by a spring it thrusts needle thro'
back, & y. blunt one is left in y. eye
So in this case y. operator must get above
y. needle above y. lens, & merely to press
it down. But an eminent Author has
more than a needle of y. common shape
quite round, so is used in sewing, so he
evidently struck y. needle into y. body
of y. lens, pulled it so it went upon y.
needle. Dr. Taylor sometimes practised
in

in ye one way, sometimes in ye other, he used a sharp needle, & seemed to have stuck it into ye lens, that he meant to depress it only but he used a sharp needle, & a round blunt one of Gold, he made ye hole in ye cataract coat wt ye sharp needle, & sought for ye hole wt ye blunt one, tho in private he only used one. Now I am convinced not only from ye success of Hilmore, but from ye reason of ye thing, yt it is best to dilate ye needle into ye lens. He did not need a speculum for this operation, at least we may do it without one, for ye needle gives ye Eye tolerably well. The Surgeon rests his hand upon ye Cheek, turning ye needle opposite to ye part of ye eye to be wounded pulling down ye under eye lid, whilst ye assistant raises ye upper, & he dilates it at once into ye eye, & now he directs ye Instrument so as to get between ye lens & Iris, which should be ye next object till he see ye point of his needle, looking thro' ye Cornea, he then turns it back & dilates it into ye lens he then makes

a

a hurry to ye bottom of ye eye, & bringo his hand forwards in order to push ye lens under ye vitreous humour, & he tracks it there for a few seconds till ye humour within his pupil & needle disappears out of ye eye. He then immediately draws ye eye towards ye direction I gave formerly.

Now which method ought we to prefer? If both operations were to be equally in all possible desirable, we should be much at a loss to determine. There is less Inflammation preceding ye operation done properly after couching, but then ye one is a radical cure & ye other is only proue palliative. Then if ye lens is very soft, there is no possibility of touching it, but you may extract it with a spoon by inserting a little water. But I find preferve to prefer ye extraction to ye Couching to prevent Surgeons from pretending to do an operation, which they are not qualified for, but would & tear ye part to say when we take ye same number of Patients on which ye operation has been

been (some) more recover after extraction than
after touching. The parts are seen in extrac-
tion, but they are concealed in touching, so
would provocate ye extraction of ye tunic, till
ye effects of it be better known.

Tis we hope suppose that from any
cause, after touching or extracting suppose
ye Crystalline lens, a membrane has grown
across ye pupil, or yt ye Iris has been in-
flamed, & ye sides of it have united (some
of ye cure), we are surely in such a case to
make some attempt to restore ye sight of
ye patient, however small ye prospect may
be of our succeeding, or we are wt Cheselden
to attempt to form an artificial pupil, he
cut ye sclerotic coat nearly opposite ye
couch, & brought ye point of his knife
forwards till it appeared in ye aqueous
humour. Now instead of this I would make
ye cut from before backwards, as we know
ye wounds of ye cornea heal readily, so
a touching needle may be passed at ye
side of ye cornea, lower than ye axis, &
we form our opening either straight, or cru-
cial

cial, as we can describe it, viz. the, & then may be
merely a membrane, before it, as capsulatine lens
as we avoid wounding the other body, & partly
tearing it, retina or Iris itself as well as it.
choroid coat. ( )

Let us next consider the method of curing
accidents of this kind to Watchmen, as when
bile is risen or sharp substances stick in it
and produce it most inflammation with
excessive pain. We remove bloody cutting it
hence with a lancet, which we use as in bleed-
letting, introducing it point & cutting directly
upon it substance. ( )

Lect: 99

. At our last meeting I observed it manner
performing it operation of it Cataract upon
it left eye, supposing it Surgeon to be
right handed. But if it disease in
it right eye he must either operate with
it left hand, or he must change his pos-
ture, placing himself behind it patient
An, to prevent any change of posture, he
may use another Instrument also, it in-
vention of Mr Millar, it is nothing
more

more than ye lancet stood to ye handle nearly at a right angle & ye lancet is more somewhat longer than ye diam: of ye Cornea, & ye patient may be directed to look a little sideways, then having fixed ye Cornea receive ye lancet from ye inner side of it, & in this way he can execute ye operation, as easily upon ye right eye as upon ye left.

Last, suppose ye Ball of ye eye turns Amaurotical & yt ye Cataract does not yield to ye common remedies, we let out ye humour by making a puncture, & instead of a general increase of all ye parts, ye watery cavities ye aqueous humour may be chiefly, in fault so we would first make a puncture in ye Cornea w.t a couching needle. If ye Cataract shall return & increase to a great size, we would then make a larger incision, & push out ye humours, yt ye Ball may shrink & what will more effectually empty ye ball entirely, we would make a large puncture of ye lancet behind ye joining of ye Cornea, w.t ye Sclerotic Coat. But there is one position which I would observe here, yt

pannel.

sometimes where water appears to be y.e cause of y.e distension, it is in reality owing to a cancerous substance, & we should be cautious in y.e way of treating such. I have seen several cases of this kind where was a clearness in y.e pupil of y.e eye, but there were large & hard swellings under y.e ear, upon y.e neck on y.e same side, as from these & y.e pain y.e patient, who was a child, complained. I could feel y.e disease was of a cancerous nature. Mr. Millar who attended y.e patient with me made a small puncture here, & y.e substance went into a substance not thicker than a clot of blood. Upon this we desisted, & y.e puncture healed up, but it afterwards broke out into an open cancer, & killed y.e patient By y.e dye such cases as this show that there are lymphatic vessels in y.e eye, it therefore appears y.t y.e eye is in this state, & y.t swellings are not formed in consequence of it, or y.t there may be removed, y.e wept blood in y.e perspiration of y.e eye from its vessel. Now y.t appears to be a very dreadful operation

from

from y^e^ quantity of blood which must flow out
& y^e^ number of nerves which are divided y^t^
experience has shown y^t^ y^e^ operation may
be done easily, it has been done twice in
this place, & in many troublesome complaints
followed. Reason y^t^ y^e^ lids cut out y^e^ mem-
brane making y^e^ connexion w^th^ y^e^ ball
& stops y^e^ bleeding as soon as y^e^ sponge, In
like manner it may be necessary to per-
form y^e^ operation when y^e^ lachrymal gland
is affected w^th^ cancer, & we can't get at it
we must bring y^e^ eye along.

Next let us consider y^e^ complaints
in which y^e^ Ball of y^e^ eye are concerned
& first we find that y^e^ Tunica adnata or conjunc-
tiva in full of vessels conveying red blood
to this part is a frequent seat of Ophthalm^a^
which sometimes increases so much y^t^
y^e^ membrane is swelled out double between
y^e^ eye lid & y^e^ ball. In such cases where
y^e^ common methods of relieving Ophthalm^a^
fail, Surgeons do service, especially
if y^e^ disease is not scrophulous, by excis-
ing y^e^ membrane, or sheath of y^e^ Sclerotis
still

skill continue, by cutting off considerable portion of it, & Dr. Taylor gained great reputation by this practice. This method was by help of membrane & thread, or even by passing a round needle & thread thro' the membrane thro doubled then to cut off both ends of thread close on membrane, with a pencil or knife a piece of corneo Sclerotica. This operation not only gives a discharge to the vessels gorged with blood, but lessens the pain greatly, which is increased by the tears running along the part naturally defended by the skin of the voluminous Duct being no longer pulled from the corneo then but the inner & more tender part of the Eyelid.

Sept. 1st. I observed a contrary complaint of the edge of the Eye lid from the tarsus, the skin is turned inwards, by which the hairs upon the edges are directed against the ball, which proves a cause of very great uneasiness & Inflammation for which Surgeons are at a loss to find a proper remedy. Now I have seen a

good

good Coal of relief obtained by drawing of under
eye lid Commonly, then taking a large piece
of sticking plaster first upon y. eye lid, &
then slicing it below, to y. Cheek, which hinders
y. eye lid from taking again y. situation. But
if still y. disease recurr, we either cut out
a part of y. skin to shorten it, we draw
it out double till y. eye lid have got a proper
situation, pass sutures thro it, & cut out
what is superfluous, or we may get a rid of y.
hairs upon y. edge of y. eyelid, we cut them
in vain, for they grow again harder & sharper
than before, Some endeavour to pull them
by y. root, but generally as much remains
of y. bulb as grows again, Now, I have
thought of cutting upon y. bulb w.th y.
point of a lancet, & turning it out.

Kept in consequence of Inflam-
mations of y. eye, & more particularly in
y. Tunica adnata, Spectra seem on y. Cor-
nea, which sometimes appear like a thin
cloud, semi transparent, while in other
cases they have a greater opacity, or white-
ness, & in many cases if you take narrow

by

by you perceive (doubtless) a number of such vessels which in yᵉ Cornea &c. are not perceivable by yᵉ natural vessels of yᵉ part being entirely by an error loci, as Boerhaave speaks. I would be willing to admitt yᵉ possibility of yᵉ error loci of Dr. Boerhaave, but in this case it does not take place, but from yᵉ Tunica adnata, there is a greater & vessels which encroachment yᵉ surface of yᵉ Cornea, there is an adventitious layer added in consequence of yᵉ Inflammation. Now this leads to a ready method of Cure. If yᵉ specks be slight & yᵉ Inflammᵒⁿ in yᵉ rest of yᵉ eye be subsided, I have repeatedly seen it dissipated where little else was done, but yᵉ defending yᵉ eye from light, cold, heat, giving per haps a slight purgative from time to time & washing yᵉ eye wᵗʰ cold water, wᵗʰ a small proportion of Saccharum Saturni dissolved in it. But in other cases more powerful remedies are necessary. I have certainly yᵉ Mercury given in a slow manner to touch yᵉ mouth gently for a length of time, has a very great effect. I have seen

yᵉ

y. whole Cornea' as red as y. Tunica' Conjunctiva
& yet after ten months every unfavl (disappear'd
but supposing that these remedies likewise
have failed, from y. Cicatrice' being on y. ver.
face, we are led to a method of Cure, which
has been long practiced by different oculists
y. dividing y. nebula w.t y. knife entended,
used in this M.r Millar has done more
service than in any other of his operations
& this method is this. He applies his Specillum
oculi, by which he secures y. eye; & keeps y.
cornea in view, he then takes a knife, or
small convex edged Scalpel, which is extremely
sharp, & w.t this he first makes Circular
cuts around y. edge of y. Cornea, & he further
makes cross incisions, dividing y. tunicles
of y. nebula, which he examines from
time to time w.t y. magnifying glasses.
Nerio this all, but after making these
incisions which cost a good deal of pain
& rescaling them perhaps once every second
or third day at Saubieul, he kept upon
a practice, which one cannot see without
feeling for y. patient, & yet I do not think
perse

seem y^t the pain is considerable, he takes a piece of sponge, which appears to be Sponge-tent, but y^t seem of his vessels, spread on linnen, & lays it between y^e eye lids, closing y^e vide pieces over y^e eyelids, till y^e double edge touches y^e Cornea, he then professes lays y^e sides, & fixes it on by bandage, & he very gently applies from time to time a water w^t Camphor in it. Now w^t could giving any medicine inwardly y^t could have effect, unless perhaps Antimonial vomito, which seem to have some singular efficacy, I have seen a very great abatement in y^e Inflammation.

The Ducts conveying y^e water over matter and sometimes obstructed, & hence from which generally insume, suppurate y^e discharge y^e volumi, but where they remain indolent & increase slowly, there may be a necessity for cutting out y^e Solumi, by an incision.

Nept supposing that in consequence of y^e operation I have mentioned, y^e ball of y^e Eye shrunken, some endeavour to conceal

real y^e (deformity by an artificial eye, a piece of
Glass on which there is a representation of y^e
Cornea, Iris & pupil. These are admirably well
executed at Paris, y^e person who sells for y^e picture
of y^e eye). We introduce such substances into
y^e eye lids, & unless y^e ball is altogether
shrunk, it carries y^e plate of glass with it.
But y^e advantage which arise from their
use, (do not) ballance y^e uneasiness they
occasion, fretting y^e eye lids at y^e inner
commissure, so perhaps y^e patient had
better be contented with concealing y^e eye
entirely. o

Next suppose y^e y^e eye is weak, &
we mean to defend it from y^e light, in-
stead of doing y^t by a darker covering, it
is better to use an instrument, which
applies to y^e part readily, & is supported
by a circular round y^e head, & a visor
over it, & we cover y^e opening with a piece
of Gauze. o

The next complaint which I
mean to describe has been treated of at
great length by Surgeons, & many Volumes
have

have been wrote upon ye subject, I mean the treatment of ye

Fistula Lachrymalis, by which I am. to understand merely a disease which is incurable in whole or in part ye flow of ye tears from ye eye into ye nose. You recollect ye Anatomy here, that ye tears are separated from a Gland above ye outer corner of ye eye, & are discharged by a number of Ducts within ye eye lids, so as to wash ye eye, then falling by their weight downwards, they are catched by ye edge of ye under eye lid, & conducted by it as in a Gutter to ye inner corner of ye eye, which is lower than ye outer & here they are received & carried from accessing by ye caruncula Lachrymalis, & kept applied to two small holes, ye puncta Lachrymalia from which Ducts convey them to ye Lachrymal Sacks, & from ye into ye nose, thro' a duct which opens under ye os spongiosum inferius, between ye bone & ye palate which divides ye nose from ye mouth. Now experience shews ye a stoppage of ye tears happens frequently between ye

y. sack, & y. nose very seldom between y. eye & y. sack, you conceive y. passage will be more frequent in y. lachrymal passage from y. acrimony of y. tears, for it is in vain to say y. nature fills y. ducts for y. liquor they convey, as she wings nile her assistance mucous lacunæ to defend them; & we find y. membrane of y. nose is readily obstructed in y. coryza; when y. tears trickle over y. face. The tears which naturally produce obstruction here, hinder a Diseased from healing readily, y. acrid liquor prevents their healing, especially as y. membrane is confined w.t in a bone, & we can't take off y. tension by applying emollients, or expect relief by y. yielding of y. sides.

The symptoms are these, The patient at first is sensible y.t the tears trickle over y. face, The skin about y. corner of y. eye is red & somewhat excoriated, he feels an uneasiness about y. corner of y. eye, & if he examines carefully, he finds a degree of swelling or dilatation of y. lachrymal sack, & on pressure he finds y.t a liquor

purulent

regurgitates thro' y^e punctu lachrymalis at first
resembling y^e leave, but w^th a few small of
mucous matter, at length y^e colour changes
& in y^e end matter is discerned mixed w^th y^e
tears, & y^e puncta come to be inflamed, and
dilated, there is a corrosion of y^e tegument
of y^e sack, & a sensible fluctuation of matter.
The skin is at length destroyed, & y^e puncta
be introduced, y^e bone is sometimes seen
carious, & in a few rare cases, a spongy
flesh grows out, particularly if y^e disease
has been preceeded by y^e Lues Venerea, both
y^e Lues Venerea & cancer having a particular
determination to y^e part, in so much y^e
have been y^e skin affected here in both these
diseases & grow cancerous. Where there
was no disease in y^e lachrymal sack, &
y^e part ought to be carefully examined before
we make a prognosis or perform an operation.

Let us next see what authors have
proposed by Surgical means for relieving
this complaint, We endeavour either to
palliate or to cure it by a general Anti
phlogistic Course, but unsuccessful
effect.

effectual, what other methods ye Surgeon to employ I shall describe ye different methods, & to save time make a few remarks upon them

1 They inject into ye vagina some heating & discussing liquor, which they propose should be done by a small Syringe, w.h a pipe adapted to ye Canalum lachrymale, but admitting yt some liquors may have a healing effect may remove ye Inflammation produced, or a weak solution of ye Saccharum Saturni, are we under a necessity of injecting this? I assure them we are not, Strict such injections are difficultly executed from ye smallness of ye canula, & they never fail to give very great torture ye part being highly sensible & by dilating ye canula, we lessen their power of performing ye office of absorption & ye very use of them here inevitably overlooked, for we need only to empty ye vagina, & to pour ye liquor between ye eye lids, & it enters as well as ye tears. So we would discard altogether ye use of injections in this manner. Nitr. acet. it has been proposed to throw ye injection up-

wards

wards, & I showed you ye possibility of entering a probe into ye lachrymal Duct. But because ye difficulty attending it just now mentioned, how is this to be done, if ye tears cannot be drawn to descend thro' ye Duct? so both of these measures are out of ye question.

Next it has been proposed to break by destroying matter wt. probes introduced at ye puncta lachrymalia, & to open ye passage but how they entertain a very erroneous idea of ye disease. How do we discover ye thickness and substances in ye passages of ye eye. Then by seeing ye mucus wiped wt. ye tears, & if we can press it out in this manner, what is ye use of probes? & considering ye crookedness of ye ducts, & ye difficulty of passing such, while ye thickening of ye membranes which are in an inflamed state occasion ye stoppage, we would need such instruments —

Next another project has been of late brought upon ye field in ye French Memoirs, a flexible probe wt. an eye in it, like a common needle, to introduced wt.

wt. yt. eye downward into yt. punctum lachrymale
brought into yt. lachrymal sack, & from yt.
into yt. nose, then we are to lay hold of it &
to draw it out of yt. nose, & to prefs a small
valve into yt. eye of yt. needle, then we draw yt.
probe up again followed by yt. valve. The plain
objection to this method is yt. extreme difficulty
of speculing it & yt. obstruction of yt. duct, yt
it is kept to impossible to speculate it. So
this method is likewise to be laid aside.
When mentioning yt. Injection, I ought to
have taken notice of yt. injecting of smoke.
They consider this as a disease, where there
is a great deal of moisture, so they would
dry yt. membranes, as they do a ham, by
smoke. But really there is no kind of idea
of yt. nature of yt. disease comprehended
in any attempt of this kind.

The next attempt is this, as yt. sack
swells we are to counteract yt. swelling
by pressure, we are to apply a compress, &
you will find one painted by Sharp, a bit
of linen is applied to yt. part, upon a pro-
per compress, & roped in its place by a cir-

cular

cular veins of head &c & such Instruments may
in a few cases be of some use, yet by merely re-
moving of distension, they can have no effect,
their only use is to prevent. of very sharp liquors
of Scans, fermentating & imitating of water
as having first mixed of with Saliva
mi Salivi passed into of eye, we have of
video contiguous by such an Instrument ...

But supposing this method to fail
it remains to give an outlet to of matter of
of water by an incision, & immediately after
that some ancients, & some of of Moderns fol-
lowing them have applied of hot iron to destroy
carious bone, & to this view of Moderns
would have added to make a passage to of
bone (but you will find in . lib. sharp
sufficient reasons for laying aside these
Instruments, as we can answer of purpose
by others which are much better, & we
~~may~~ make an Incision on of back, then
of Surgeon looks for of passage down
into of nose, & tries to pass a probe down
into it, as some have proposed to do.

But, if he does not discover it
of

y natural passage open, he proceeds to make an artificial incision, wch is described by Sharp. A piece of wire crooked in manner shd be thrust through y. Urethra & turned sidewayes to breake a large hole. But this breaking seemed of superfluous, & doth argue much more than is necessary, & rather extending this seems to be y. wrong, you will not find y. Sharp takes paine to prevent y. opening after it is made. So I would rather do y. operation as it was practiced by my Father in a general way. With a small Trocar we perforate y. Os Vrinæ, then preserve y. passage made by probes & injections, we introduce a leaden probe thro y. Cannula & y. Trocar into y. neck, which we keep there till y. part is become callous, nor is it necessary to wth draw y. probe, & to throw in injections y. probe rendering y. part callous, if you apprehend y. lead may injure y. bone by its hardness, we may use a common Bougee, or other soft material. That in one patient who happened to go to y. Country but 4 not return so soon as he expected y. probe was left in y. passage for 9 months

months without any bad consequences. If ye eye
(and perfectly callous, some have presumed to
introduce a pipe of Silver, & to allow ye flesh
to close over it, but this is not necessary, for
ye layer preventing ye passage callous, & keeps
up ye opening. Besides such a substance
left might occasion Dividen, might mortify
& so may calumate or inwards & fall into ye
cavity of ye nose.

This Head, and ye general Direction
& upon ye whole I would advise simply as
follows, we attempt in ye slightest stage of
ye Disease to wash ye sacks w^th an eye wa-
ter poured into ye eye, as a weak solution
of Saccharum Saturni gr. 1 to ye ℥j of rose
water. The patient is laid in his bed upon
his back, & a tea spoonful of it poured
into ye eye, or he fills a quill w^th it, clasps
his fingers upon ye end of it, till he is
above ye eye, & then removing ye fingers
gently into it, & he may continue in
this posture for 5, or 10 minutes, till he
feels a little glow about ye corner of ye eye
then he pulls back ye inflation, and
hinders

hinder ye. humor from entering by a moderate Compression, & in this way we may prevent ye. natural progress of ye. disease for a number of years But suppose either yt. ye. matter have made an opening, or yt. ye. Surgeon finds a Convenion he makes ye. incision w.t a common Scalpel guided by ye. part. Now we can w.t out much difficulty determine ye. place, we feel for ye. tendon of ye. orbicularis muscle, which is connected to ye. lip of ye. lachrymal sack, & we give a free opening to ye. skin for admitting Medicaments, & yt. ye. wound may heal slowly, we begin higher than ye. tendon, & bring ye. incision down a finger breadth & more, following ye. course of ye. duct as nearly as we can & as ye. puncta lachrymalia are generally at ye. same time dilated, ye. Surgeon may if he choose introduce a probe into ye. punctum We are not under ye. necessity, of cutting ye. tendon of ye. orbicularis muscle, but We know from experience yt. ye. cutting of it is not attended w.t any deformity; ye. cicatrice excepted, there is no retraction of ye. parts being griped to ye. bone, so w.t a concave edged

wyre knife wc̄ouide ꝺ. lenden of ꝺ. orbicularis
& lay open ꝺ. sacke ꝺ whole way. -

Immediately after making this incision
Surgeons take a common probe & try to passe it
into ꝺ. nose, & they should allow ꝺ. duration
of ꝺ. passage Commodious, cutaneous & backwards
for by turning ꝺ. point too much inwards
they may imagine yt it is impervious when
it is not. If they find no passage, they immediately proceed to ꝺ. making an artificial
one, but tho' no passage can be found at
first, in ꝺ. space of a few days when ꝺ.
Inflammation has subsided, a common
probe may ye made to enter, & no further
operation be necessary, only we preserve
ꝺ. lips of ꝺ. wound from closing by introducing a dossil of lint, or a thread put
round it. But suppose we had wounded
ꝺ. sacke perhaps, & are not able to passe
a probe, an artificial opening is necessary
Now you recollect where this is to be
done, the lachrymal duct is supported
partly on ꝺ. nasal process of ꝺ. maxillary
bone partly on ꝺ. Os Unguis, which is
outermost

externall. In this Bone there is a ridge & whats
ye membrane of ye orbit is connected, so yt it
makes ye boundary betweene ye external & inter-
nal part, this ye processe of ye maxillary bone
is very thick & hard, & if you go within ye ridge
of ye Os Unguis, ye tears may get betweene
ye membrane & eye ball, so we are confined
to ye outer part of ye Os Unguis, Wee take a proper
perforator as large as ye naval duct, & make
ye perforation thro' ye os unguis, then wᵗ drawn-
ing ye perforator thro' ye canula, introduce a
leaden probe, & leave it in ye orifice till ye
part becomes callous, only drawing it back
a little, yᵗ ye end may not rub against any
substance. Where we cannot force ye natural
passage we begin wᵗ small probes, or
we may introduce a softer substance
as a bit of catgut, some have proposed
Selano, they pass a setan thro' a hollow tube
wᵗ ye head of a large pin they make a proba
point to ye tube, & enter it down ye pass-
age, then taking hold of ye tube wᵗ a pair
of forceps wᵗ in ye nose, they pull it out
but this is not preferable to a Bougee

4

Two things remains to be (added, viz. first
we observe ye lachrymal sack inclining
& yt ye mucus begins to be discoloured, we
may have reason to expect a total obstruction
of yt duct; & yt it is confirmed when on pressing
ye puncta & sacci we are not able to force
ye matter into ye nose, I have thought
yt we might save ye pain & dejunnily of
an incision by passing a trocar thro yt
tumour, cutting ye tough skin w.t ye point
of a lancet, on w.t drawing ye perforator
ye trocar pun out, & introducing ye probe
we search for ye place, make ye perfora-
tion, & leave ye leaden probe in ye hole for
a day or two, or perhaps ye trocar passing
thro would procure a passage.

How we in doing this operation
ye making an artificial passage, ye advan-
tage of a syphon is lost, & we would
expect yt ye tears would readily flow
& beyond doubt some of ye tears generally
run down ye face. But we are not to
infer from this, that ye operation serves
only to let the air into ye sacci, & to occa-
sion

sion of glueing together the sides, first burn
the ends of leads pale tolerably well but leave a
small share of them (as in altering the face, a
little powder may be rubbed on the skin to prev-
ent it from being spotted.

It shall not return to the operation
proper to be done in the Organs of Generation
in both Sexes.

Sect VII

Suppose there is an Incontinence of urine
in either Sex, & that the medicines we give
have failed in their effect & the relaxation
of the sphincter of the bladder seems to be
the reason. We are under the necessity of
mechanically stopping the discharge &
in the male, instead of a Bandage round
the penis, we use an Instrument called
the Fuqum penis. I have caused this to
be made of one piece, which opens by its
elasticity, & I use a screw for the bringing
it to the proper situation. Once thought
of another Screw, to press directly upon the
Urethra, but I find that it is unnecessary
the same complaint occurs in women

one

in y. bed contrivance is recommended to
us by Mr Wistar, y. mean a ring, whose is im-
plyed for y. prolapsus ani, only we must
bring it down, we can be sure upon y. urethra
we shall y. part by it; if we wish to pre-
serve at a particular place, we fasten
to y. ring, a bit of sponge which we imbrue
in

Yet suppose y. contrary complaint, y.
y. patient cannot discharge his urine, after
attempting relief by letting blood, fomen-
tations, y. warm Bath &c. y. Surgeon en-
deavours to draw, y. water off by a Catheter
y. use of which in y. male is already
known to you, we introduce it in like
manner as y. sound or sliff. In y. fe-
male we use a Catheter streight, or nearly
so, for it will be better to use Elastic gum
bougies, for the urine y. bladder is empty
y. urethra can be brought into a streight
line, yet when it is distended, y. urethra
is somewhat crooked. I should you former-
ly y. method of sounding, or introducing
a Catheter in Women. Note, these are
generally

generally made w^th a number of small holes
being, least in danger of hurting y^e Intestines but
you should be provided w^th others which have
a large opening, at one side; for I have repeatedly
seen in Calculous cases particularly where
quantity of slime in y^e bladder, y^t it could
not pass thro' y^e small holes. But my reason
why y^t y^e Surgeon finds it impracticable
to introduce this Instrument he is not under
ye necessity of puncturing y^e Bladder
& only difficulty is to determine y^e proper
place. I formerly shewed y^t it was possible
to carry the matter puncture into y^e bladder
at y^e very place where we begin the incision for y^e lateral operation, & where in
Thouberres method, we finish y^e incision
y^t is near the y^e neck of y^e bladder or at
y^e lower part of it. I prefer this to other
methods which have been proposed, the
most common way to introduce y^e staff
as far as possible in y^e urethra; my reason
near the y^e neck of y^e bladder, then y^e Sur-
geon cut in upon y^e staff, as if he was going
to perform y^e lateral operation, but
instead

instead of using a Gorget, Knife &c. (as usual
to take a trocar, & to follow as well as we can ye
natural passage. Now in this attempt we
cannot possibly follow ye urethra exactly but
cut & tear it, & wt it ye prostate gland
vesiculæ seminales, & we thus tear & cut ye
very part which is in a diseased state, So
this method has been laid aside by Many
who make an incision above ye os pubis thro
ye skin, then ye trocar in passed, Now there
is no difficulty in entering ye instrument
but when you have drawn off ye water, ye
bladder slips away from ye instrument
& if we keep ye canula wt in ye bladder
we may by pressing it to ye pubis press against
ye back of ye bladder, & intest: rectum, So
sharp gives us a cave where ye canula
wrought into ye cavity of ye rectum, if
again it is too short ye bladder slips off
from ye end of it, or if ye canula is too
ye urine gets into ye cellular substance. But
if instead of this, we make ye puncture on
ye outside of ye prostate gland, we are sure
of hitting ye bladder wt as much safety
as

as above y^e os pubis, & we have y^e advantage y^t
y^e urine, that nothing is done to prevent it
does not fill into y^e cellular substance
& if we have a Canula, we readily fix it in
its place & y^e urine runs that y^e Canula as fast
as it gets into y^e bladder, & we may preserve
it here for several days together, till y^e Inf-
flammation at y^e neck of y^e bladder by y^e
continued use of remedies has subsided, we
need a lancet or common scalpel to cut a hole
in y^e skin, & y^e trocar w^th its Canula, &
assepticke Catheter, which is an instrument
on y^e common one, it is made by twisting
out of wire, & covering it w^th linnen spread
w^th plaster, as if you were going to make
a common Bougee, & this can remain in y^e
bladder w^th much greater safety to y^e
patient, In puncturing y^e trocar, to prevent
any mistake, we may introduce a Cathe-
ter into y^e urethra, as far as y^e neck
of y^e bladder, & we pass y^e Trocar at y^e
breadth of a finger or so from y^e side of
it, pushing upwards & a little forwards
till we are sensible from y^e want of

resistance

violence, yt we are within ye cavity of ye bladder, & taking away ye cannula, we leave ye soft flexible Catheter, & suspend a bandage w^ch is circular round ye pelvis, & we allow this to remain, till perhaps by stopping ye end of it collecting ye water within ye bladder, we find yt ye patient can passit in ye natural way.

. Next suppose ye same complaint in women, & yt we cannot even in those draw off ye water by ye Catheter, which you are sensible will happen less frequently from ye greater wideness & shortness of ye passage & ye want of ye prostate Gland, which mechanically presses upon ye neck of ye bladder, you recollect ye manner of introducing ye Catheter in ye female, under ye Clitoris between ye Nymphæ, & if you are not allowed to see ye urethra, you prevent ye Instrument from entering ye Vagina by applying ye fore finger. Next you distend ye bladder, & there are ye same reasons as in ye male, for avoiding to puncture it above ye os pubis, & there ye reasons are still stronger for puncturing

ring it in another place, as we cannot only
(as y. lateral puncture have by pushing y.
Instrument at y. side of y. Vagina, but in
y. crus of y. Clitoris, but there is a still
better method, to puncture it, from y. Vagina
after not only y. whole urethra, but a large
share of y. bottom of y. bladder, is intimately
connected to y. vagina, now can puncture or
cut from it into y. cavity of y. Bladder at
certainly, we take a trocar of y. common
length, as we may have one very purpose
to make y. perforation in a slanting direction
puncturing y. membrane of y. Vagina first
& running y. Instrument up between it
& y. membranes of y. bladder, & having
got into y. bladder, we can, as before we
drawing y. trocar, enter a flexible bougie
thro' y. Canula, & leave it in in y. bladder

Now after having shown how y.
bladder pushes down in y. female, you
will observe y. same thing happens
in y. Male, only you do not see it from
y. situation of parts, as this is to be well
attended to, because from it we deter-
mine

mine y. seat of disease. When y. Bladder is
distended, I find that in a full grown person
I can pass y. finger higher than y. pubes at
grave, which I have repeatedly found more
regular & handy upon y. one side than upon y.
other in a retracted state, & therefore if a tumor
forms about y. bottom of y. Abdomen, wt. regd.
to which Surgeons may be divided, we can
determine y. place by applying one hand
above y. Os pubis & y. other wt. in y. rectum
When we will find y. general pyramidal form
of y. bladder & be able to make y. pressure on
y. one hand affect y. other & where y. urine
is passed w. difficulty & retained in y. bladder, y. coats are apt to grow thick, & to
contract adhesions to y. neighbouring parts
hence y. patient is able to discharge only
a few ounces of water, yet y. tumor appears very large, but from y. loss of its
tone, y. emptying of it comes at last to be
merely a running over of it, & hence
yt. in such cases, y. operation of scarifying
should be performed more early & frequently than is commonly done, as it

gives

give great relief especially in ye beginning.

I hope you perceive there is a close in them & we are under a necessity of shaving it out by an operation, if in man, notwithstanding ye neck of ye bladder is surrounded by ye prostate gland & canal of ye Vesiculæ seminales call'd Vasa ejaculatoria, as ye lateral & high operation, we would do ye still more readily in women, or we would prefer opening ye bladder, where ye urethra comes out & if ye incision made above ye os pubis, & ye only point to be veilled is wt respect to ye method of making an incision about ye place. We may do ye lateral operation as in men, wt in ye case of ye Colonio, which respecting ye Os of ye pubis, avoiding ye vagina. But this is practicable, yet it is easier for Surgeons, & nearly ye same things to ye patient, to begin ye incision at ye very extremity of ye urethra, when ye Surgeon sees ye direction of ye cutting Instrument, & ye only danger is in dividing ye neck of ye bladder, ye wound in ye urethra healing up more readily, more

with

mill of calling it an urinal part occasion an Incontinence of urine. The end of ye urethra in Mares has a truly muscular power, but in Women ye water is chiefly confined by ye neck of ye bladder. Some would slit open ye urethra, which in Women not more than two inches in length. The only other method is ye making an incision from ye Vagina, to which Surgeons seem to have been led rather by accident, as we find in Hildanus yt a stone worked its way from ye bladder into ye vagina & Cooch taking ye stone made such an injection & ye patient was cured in 3 weeks, yet I do not recommend this operation, for ye urine may keep ye part fistulous, on account of ye thinness of ye membrane & instill into ye vagina, which would be a terrible accident, whereas at ye side there is a thickness of fleshy parts yt unite readily. I would say nothing of ye very cruel method which has been practiced, of forcing open ye urethra by a blunt Gorget, or ye old Conductors, ye making a slit being of much

much better. So I would confine our views to y. Division of y. urethra. We are (under) to introduce a straight probe into y. urethra, mark mostly y. length of y. urethra in Women, then pass up a double edge Lancet, to open both sides of y. urethra, & drawing back y. Lancet, to dilate y. probe y. Forceps into y. bladder. Now why cut both sides of y. urethra, if one were not enough in men, when one side only is cut no one cutting blade is quite sufficient. But Imagine y. sharp Gorget in a better Instrument it makes y. incision w.t equal ease, & by means of y. Gorget, we readily conduct y. Forceps into y. cavity of y. bladder. So w.t this Instrument conducted w.t any common staff, or w.t y. Instrument used for making y. incision in above view, or w.t a ~~large one~~ longer one, y. y. stone may be more cut of y. way, & holding y. staff laterally, we are in no danger of cutting y. Vagina, I may use y. blunt Gorget along w.t y. sharp one, y.t I may do no mischief w.t y. sharp one, & we may put out of y. question altogether y. knife of Frere Come, y. sharp Gorget and wearing

much

much better, calling on it when) as it is you know when the neck of the bladder is dilated, & immediately stops when he is voiding of a want of reviolance.

Now to finish the operation proper to the female, I shall mention a few things as respect to the Cæsarian Operation you recollect the situation of the uterus as respect to the bladder, & the rectum, that it is between them & you remember that the whole body of the uterus is covered by the peritonæum, & in pregnancy the same thing still is true, the Peritonæum remains over it, the ligamenta spring & allowing of the gradual extension & the uterus, so that they come to be much narrower in the last months of pregnancy, & when it be necessary to cut into the uterus for the extraction of a Child, as to perform the Cæsarian operation, the first step is to make an opening into the cavity of the abdomen & the second is to go into the cavity of the uterus. Now if a Woman dies suddenly in an accidental way, we endeavour to save the Child by making an inci-

sion

non exquisitely impossible, but suppose that
y. child cannot be delivered, & y. pain & mis-
chief of y. natural passages before you
can extract y. operation, you ought most care-
fully to attend to y. cause, & if y. woman ever
had a child at y. full time y. operation is not
necessary, because that y. delivery may be
necessary to save her life, it is better to force
y. to travail, than to undertake this opera-
tion which is highly dangerous & we have been
misled w.t respect to it by single successful cases. It has been performed here five
times, & in several of y. cases y. patients
were in their ordinary state of health, & every
one of them died, so we are not to undertake
it w.t out y. most absolute necessity.
It is not necessary if you find y. person
of a moderate size & tolerably well
made, sometimes y. deformity is confined
to y. pelvis, but y.t is very rare, & y.
presumption is y.t y. fault is in y. passages
only, & y. operation has been done when
this but really was y. case. So we
ought to examine y. general size & shape
of

of y. pubis, uncovering y. fundus vt. y. Vagina & intestinum rectum. How suppose this matter ascertained, & yt we are about to perform y. operation; it is necessary first to empty y. rectum, still more y. bladder. In doing y. operation Surgeons are not aware of y. whole danger. They conceive it to consist in y. nature of y. parts divided, whereas it is very much owing to y. admission of y. air into y. cavity of y. abdomen, & especially if blood remains in y. cavity, so we should go on wt. y. operation very cautiously. The place is tolerably well chosen, it may be between y. recti muscles, tho perhaps it is rather better to go on y. outside of y. rectus. We do not cut thro y. rectus, on account of y. trunks of y. epigastric artery, we choose y. left side, if y. Surgeon is right handed. We first make y. incision thro y. integuments & muscles, & lay y. Peritonæum in view, & then we close till y. bleeding ceases & a large artery springs we take it up. Then we cut y. peritonæum which is to be done wt. caution, for tho generally y.

intestines

Membs is contiguous, yet some time of y. Umbi-
licline may have yet between, or we should
make a small hole & slit it open very carefully then we would press down y. Funiculus
um & y. membs to prevent y. air from getting
into y. Abdomen, & in cutting into y. uterus
we keep y. midale of it, where y. vessels
are smallest, & the y. vessels of y. gravid
Uterus are very big, they do not pour out
so much blood, as might be expected, we
then divide y. membranes of y. Child, &
take it out w. y. placenta, Hand is now
first more to be taken, to introduce y. hand
into y. mouth of y. uterus, & w. y. fingers
to open y. Os Uteri, to allow y. blood natu-
rally discharged, as well as that which
comes from y. mouth, to pass downwards
by y. Vagina). We next endeavour to close
y. mouth, Dam not certain whether we
ought to make a slight stitch in y. Ute-
rus itself, drawing y. sides moderately
together, & bringing y thread out at y.
tegumento. Having let all run out y.
comes readily, we shut y. mouth in

y.

y. Abdomen matrix y. stitches near to each
other which, y.nd of effect in naming y. Lues
y. humalis, but if we extirpate y. Bubo
will be discharged, we leave y. bottom of y.
wound open, only covered w.t a thick compress
to prevent y.e air from getting in, & we continue
wd y. Antiphlogistic method during y. Cure

As I have spoke fully formerly of y.
treatment of y. Venereal disease, I have not
repeat what I then w.t respect to injections
now it worth while to show you y. common
Instrument for making them. But from
y. uncertainty of their effect, we ought at
least to be careful to prevent y. matter
from being pushed backwards in y. urethra, as a swelling of y. testicle is frequently occasioned by y. use of such injections. Last suppose y.t y. matter is translated to y. Groin & a Bubo formed I would observe y.t if Buboes were more left to nature, y. Cure would go on
well on & y. Incisions Surgeons make are at least often unnecessary, & also more y. cutting out considerable portions

of

of y. skin.

And there is often a doubling of y. skin y. serves, & sometimes often suffers, as in the second case &c. There is a vacuous matter separates betwixt y. circumference of y. Glans, which becomes acid, & influences y. part, & a wash of Saccharum Saturni is effectual in removing this complt. But especially from y. Chemical diseases y. prepuce grows thick, & straitened on y. Glans & y. straitening is before y. Glans, y. it swells, & hinders y. urine to be passed w. ease y. complaint is called Phymosis, but if y. skin is straitened beyond y. Glans, it is called Paraphymosis, & here y. only difference is in y. situation of y. skin. Sometimes at birth y. skin is found to be straitened in y. manner; especially before y. glans. You take y. most simple case, suppose y. straitening natural, what kind of operation is necessary? you find y. practice recommended, which religion or superstition introduced, from y. same idea y. any part could be hurtful to us we are directed to draw forwards y. double skin,

skin, & cut off a circular portion of it. But
it is difficult to perceive y. necessity of this al-
most in any case, as it is evident y. sticking
upon y. side will answer all y. purposes y.
skin is applied only at y. anterior part of
y. lightness of a circle at one place, & pulling
y. circle y. whole becomes loose, so a wrong
reflection has led to advise y. complete
circumcision. After dividing y. side you
may draw back y. skin & keep y. divided
parts asunder, i.e. y. void may be
filled up w. new flesh, which soon gets
loose, soon to be moved at pleasure
but supposed a Venereal cause, y. same
thing applies y. skin was formerly made
enough, & is now grown about by y. de-
cause & supposing y. common remedies
to fail, I have sometimes seen y. skin
of y. penis shaved, in imitation of Cowper
but this is dangerous on account of y.
nerves, & has been proposed more from the
anatomical than experience of its effects. So we
would not practice, taking care y. y.
Venereal matter does not touch them, lest
Venereal

Venereal Diseases to be produced, But supposing yt. common methods, telling Blood at yt. arm, yt. general Sulphurious method, & yt. inspecting Venereal Ailment under yt. prepuce as there are generally Diseases & this seems to have some effect, perhaps any greasy substance would have yt. same, but supposing that these fail, we shd. open yt. vein some use again of Skipears, which create a great deal of torture, & at any rate yt. skin is too thick than to be cut easily w^th. skipears, it is better to take a very small Surgeons probe, & introduce it between yt. Glans & prepuce, & cut upon it, or we introduce any thin plate of metal, as of Silver, & cut upon it. Or there may be otherways contrived, we may introduce a small tube between yt. Glans & skin, then pass thro' it a knife, we' we push thro' yt. skin, & drawing it for. wards we make yt. incision, & first we ought to draw back yt. skin till we find a resistance, only pulling it forwards, when we have hold of yt. shortened part, we make yt. cut on yt. vein, avoiding yt. under part on account of yt. Frenum, & yt. upper on account of yt. large veins, &

yt.

y. prepuce is cancerous in cut it off in ye
skin & spatula between y. prepuce & Glans to
isolate it & make y. incision on y. spatula.

If there is a paraphymosis y. best method is
to cut y. doubled skin w.t a lancet, making a
number of Incisions, where y. stricture is
greatest, for y. ring straitening y. Glans, may
soon occasion a mortification, or Gangrene in
y. body of it. Nept supposing y.t y. penis is
affected w.t Cancer, & to save y. life & y. patient
there is a necessity for performing amputation
My Father used long ago to alledge y.t y. me-
thod of Guyon, & of Surgeons for many yrs
was cruel & imperfect, y. making y. vessel
divided drop off by a ligature instead of ma-
king an Incision, from y. idea y.t as y. blood
is discharged into y. cells, every cell would
pour its blood in considerable quantity, now
his idea was just, y.t we ought to make
y. amputation in y. most ordinary manner,
we twist out y. skin & drawing it back,
we divide y. cavernous substance of y.
penis, & y. bleeding is so inconsiderable
y.t there is no necessity for stitching y.m

Guattro

[illegible] of y^e arteries, wch supply y^e corpora cavernosa
We may use a bit of knotting w^t a thick string
[illegible] in y^e time of y^e operation, & if a principal
artery springs, we bring it out & tie it, & if y^e ure-
thra is in danger of contracting too much, we
introduce a bit of Silver pipe, or other kind of
Canula during y^e cure.

Lecture 30th

The treatment of ye Complaint of y^e urethra still
remains, which is commonly y^e consequence of
Gonorrhœa, I have endeavoured to prove formerly
that sometimes Ulcers form w^t in y^e urethra
where they form on y^e outside of y^e Glans,
a chancre is produced, & y^t sometimes is followed
by a Verruca, or wart, if then ulcers form on y^e
inner side, y^e consequence may be y^e same.
Several Authors have denied this, but I have
not only seen y^e ulcers w^t in y^e urethra, but
in consequence of them y^e manty substance
produced. But much more frequently y^e
Gonorrhœa gives occasion to a straitening
of y^e urethra in particular places, & this
will happen nearly where there is a chordee.
which is common in y^e Gonorrhœa, y^e penis
is

in them violented, & erected w.th pain, & sometimes of hard-
nes (& sends a considerable length, but at other times
it is confined to a small spot, & if we can feel
of swelling, outwardly, a small swelling on of
inner side may shutten of urethra. As to w.t re-
spect to of cure of Veruca or Stricture, they be-
plainly proved, but especially of Veruca, of of w.ch
Venerea have preceded, yet they are no proof of of
disease is present, because we can cure either
certainly by a course of Mercury however con-
continued, & yet we admit of of Mercury eradi-
cates of Venereal Taint, or suppose that of
patient has in of beginning of of disease
taken of ordinary quantity of Mercury, but
that Verucæ remain, he may allow them
to remain w.tout dreading a Venereal taint
at of same time we should endeavour to
get rid of them by cutting them off, by (cauter-
ising them w.th Caustic, or by means of of
fulvin Salinæ, which w.tout remarkable
Pain, have a remarkable effect in destroy-
ing them, suppose neglect of there is merely
a hardness or stricture, nearly of same
things may be observed, & here I propose
pro-

pal remedy is a milk & bearable diet, wch at y.
same time may rub on y. part, Mercurial Ointm.
or apply an emollient poultice; & endeavour to
open y. passage by y. use of y. bougie, which I
believe wth Mr. Sharp, adopt here mechanically
(providing they are of a proper consistence, y. ma-
terials are of little consequence, if you except
y. caoutic substances, wth this Instrument,
for y. proper use of which, I refer you to, Mr.
Sharps Critical Enquiry, we enlarge y. hæmr
Hæmorrhoid use a small Bougee, wth a small
point, & gradually enlarge y. size, wetting
it in, & withdrawing it when it gives consi-
derable pain, at first perhaps y. patient
may only be able to bear it for half an hour
& that we should fail for two or 3 weeks, y.
cure may be completed, & supposing y. y.
materials are not of consequence, bougees
may be made of leather varnished, which
enters more easily, & will swell a little when
heated & moistened.

Next suppose y. in consequence of
stricture, or ulcer within y. urethra, or a
Verruca ulcerating at y. mouth of y. passage

for

yet y. urine so feild different, then there is an
erosion of y. Coats of y. urethra, & ostentimes of
y. cavernous substance of y. penis, & ulcerula
formed. Generally this appears in y. penis
urine, it is not very easy to account for that
but we observe it, & hence such openings
generally are named

Fistula in Penice. By y. crown
y. urine gets out into y. Cellular substance
& so soon as it has got that it passes out
of y. penis (which are so close & invitable y.
they inflame, & tender it to dissolve their
y. corpora cavernosa) it soon makes itself way
thro' y. Integuments. But I have seen re-
peated instances where it spread freely on
y. Cellular substance, between y. skin &
penis, & it does this very readily, if it runs
forwards, y. part, & particularly y. scrotum
wanting y. fatty membrane so y. it is
more loose & reticular, & y. urine clogna-
ting occasions violent Inflammation, swel-
ling & blackening of y. parts, so I have seen
y. whole of y. scrotum swelled as big as both
y. stole, & as hard almost as a piece of carti-
lage

bugs: with time ye skin is to crack & perhaps ye
crevices are in a number of places, so yt we
have a number of fistula, but still all ye passages
from one hole in ye urethra: thos in some cases
there may be more than one: Now suppose ye
disease in ye most dilate (sometimes ye urine
by stagnating produces calculous concretions
& we find stones in ye Perinæum) in what
manner are we to treat ye complaint? Suppose
yt ye general union must be there? We endeav-
our to find out ye place in ye urethra, which is
cracked before any incision is made, Surgeons
wt this view commonly probe ye fistula but
for ye most part to very little purpose, because
when ye urine has got out from ye urethra
it runs on all sides, & finds passages ye
are accidental as those formed in ye ground
by rabbits, or in mould rather more ye
leather bougie, which is smooth, & has no
ciral prominences, or what answers still better
me infect liquors, or blow in air, by which
we can trace ye fistula exactly. We intro-
duce a hollow tube into ye urethra, & coat
what part of injection passes into ye Sinus,

or

or we may try it in ye meane time, he may scum
ye Catheter of a piece of Silver plate brought endes
a wire, & made to touch, by which it is quit
flexible, & this (added to ye firmness of ye matter
& soon not to soon ye flexibility) for ye injec-
tion we may use a syringe, or a bottle (as ye
Chirurgeons) to fill it we syringe ye sides together
& hold it in ye water, & so by its elasticity, it
comes to its shape again, ye water fills it
is made of ye juice of a plant found in ye East
Indies, & in South America, it has very sin-
gular properties, there is nauseating liquors known
which destroys it, so yt you may trust
oil of vitriol in it. Hearing, found ye situa-
tion of ye fistula, in what manner are we
to treat it? There is no complaint which
gives more trouble to Surgeons, the first
step is to give a free discharge of ye matter
& ye urine from ye urethra, yt is we divide
ye skin freely, & as near as possible to
ye fistula in ye urethra. Let me make a
vow to loosen, or to remove ye obstruc-
tion of ye urethra, which is chiefly to
be done by ye use of ye bougee: If possible
we

we pass it beyond it. Sometimes we have got a common Bougie to enter, we may assist it, & cure a good deal by introducing a flexible bougie, or catheter, we pass it beyond it. Fistula & when it patient is able to make water, let him press upon y.e part of it. urethra, so as to hinder it, water from getting thro' y.e fistula & if it is practicable, we shall often succeed in making cure, for I have seen cure made after it. stream of urine was tolerably free by y.e means of it. Bougie. But if still after this we during it. passage free, we shall, it remains to make an incision into it. urethra, we pass it probe introduced at y.e external wound into y.e urethra, or we introduce a staff into it. urethra & taking a common direction, we pass it into it. fistula, till it strikes it. staff, we then make it. incision, as if we were going to the form it. operation of Lithotomy, only it it. passage is at a distance from it. bladder there is no occasion to go higher, but merely to make a shed incision w.th it knife. Then we may succeed by common dressing, if it. incision is made in a part it is likely

convex

cum, we are to join y. tops of y. mamæ together by sutures, as wt. y. hair lips sutures, & y. we may not straiten y. passage for y. milk too much, we may introduce a very small hollow bougie past y. mamæ, then make y. stitches over it & allow it to remain for several days which can be done, so y. in on ye allowing of these days, we may give great relief to some patients, & cure a great many. We must go to y. discovery of y. spermatic cord, & first to y.

Scirrhus or Indurated Swelling

Now of this there are various species.

1st There is a diffused dropsy under y. skin communicating wt. y. whole cellular substance of y. Body. In this case an operation is only needed in y. part from its depending situation for if we raise y. scrotum, & make an opening in y. foot, we can discharge y. water, & y. manner of doing this will be considered in speaking of Hydrocele in general.

Next there is a diffused dropsy in y. spermatic cord, or water may be confined by y. covering of y. cord, wt. out communicating at first into y. neighbouring cellular sub-

vulvularice. Of this kind of cyst however there are scarcely above half a dozen examples in ye late writers of Europe. We distinguish ye compliant from ye size, & softness of ye part ye want of a true fluctuation & that it keeps nearly ye same size & shape in different postures of ye body, whereby it is distinguished from ye varix of ye spermatic veins. This too requires ye ye water be let out by punctures & incisions.

Sept ye water may be confined in natl cysts, or in cysts formed by (discase) in every part of those organs mentiond in ye Tunica albuginea, that this is a rare case.

Sept there is a ligature (or pinching upon ye original situation of ye testicle, ye processus remaining) open, or ye ligature taken away under Ascites, this will produce hydrocel or suppose ye hydrocele be thrown out a vast quantity of water, it may be ye cause of Ascites. But this too is a very rare case. We distinguish it by ye water passing to & fro according to ye situation of ye body.

Sept you may conceive cysts to form

shut

shut bagg, w'out any communication (excepting perhaps w'an irregular union) of parts wch after birth, as if ye processe remains open in particular parts, shutting perhaps below & then again at ye ring, ora Hernia may happen, ye peritoneum be pushed down, & ye sack remain obstructed at ye ring, shut there, & the bagg beneath, which may come to fill w'h water, tho' I can't produce an instance of these. There is another kind which (accordg) a bagg growes from ye Tunica albuginea, or ye hydatoides, quite shut & containing water or ye water may come to fill ye whole cavity of ye tunica Vaginalis, & yet on opening ye tumor you do not find ye testicle w'in ye bagg. Two species still remain, & one of these by far ye most common, occurring in 99 of 100 cases, in ye dilatation of ye Vaginal coat where ye water collects in it. The other have been denied by some authors as Mr. Sharp, but w'out reason, for I have seen more than 6 examples of it a preternatural encysted dropsy of ye spermatic cord, a large bagg filled w'h water

water, yt. bag perfectly shut, & requiring yt. same time of treatment, as where yt. water is contained in yt. Vaginal coat, we would chiefly attend to these two species, or if any of yt. other occurr, if we knew yt. treatment in these two we apply it to them; Known first by what marks (as we distinguish yt. most common Hydrocele yt. of yt. Vaginal coat"), it arises always from to increase very slowly, that sometimes an accident gives occasion to a more sudden dilatation; It is fluctuating, pure water, & does not give much pain to yt. patient. After it acquires such a bulk as to produce uneasiness, we find yt. yt. testicle is concealed by yt. water on every where, excepting where yt. spermatic cord enters it; it is always heavy at yt. upper & back part, so yt. we can feel yt. testicle at yt. part w.th yt. finger We know next yt. disease by yt. specific by which is generally to be discerned, that this mark is not to be depended upon, as yt. water may be bloody, besides Hernia if yt. Intestines are concerned, are transparent, but we have feel yt. fluctuation

of

of yt liquor; & we perceive yt spermatic Cord unchanged between yt testicles & yt ring of yt muscles, & yt posture & situation of yt body does not alter yt tumour, whereas in whatsoever manner yt hernia may have begun yt tumor alters its situation according to yt posture, & we can in general replace it in some measure wt yt hand, we are sensible of air; & we feel yt tumor running up into yt belly. The other kind is distinguished by our feeling yt testicle distinctly quite round, generally under yt tumour not always. for in some cases yt swelling pushes down lower than yt testicle. This distinguishes it from yt Hydrocele of yt Original kind & we distinguish it from yt hernia by yt marks I have mentioned only this tumour reaches nearer to yt ring).

Supposing now yt nature of yt disease understood, here, as in other cases of encysted dropsy, we can do little towards a cure by medicines, or external applications, yet sometimes from lucky (in-

cumstances

...nicer, have succeed, or nature wou'd their assis-
tance performe a cure. Thus I have known
instances where ye operation was intended
have been performed, but ye patient invited
for a delay, & that ye tumor was as large as
Goose's Egg, in a few months it went away, but
this happens very rarely, yt. there is little en-
couragement for making trial of such medi-
cines, as may hurt ye constitution. We may
apply a warm solution of Saccharum
Saturni mixt with spirits of Vinegar, aqua
agulle fungarine, or more particularly ye Mer-
curial one, once a week or 10 days. & if this
does not succeed, we have recourse to surgery
if ye constitution will admitt of it, & at
any rate if ye tumor how grown to a great
size, we must of necessity do ye operation
The Cure is either palliative or ra-
dical, we shall have it in view merely
to draw off ye water, & ye method of doing
that is very simple, we need a common
lancet, a round trocar, or rather a lancet
shaped one, which enters ye abdomen
easy, & by ye narrowness you avoid ye
wound

repels readily, we are also provided w^th a pillow
y^e patient is laid on him back, w^th his head
over y^e edge of y^e bed, & a pillow placed beneath
y^e Scrotum. The next step is to distend y^e
tumour by pressing, w^ch may best be done
(I think) if we lay, as near, to increase y^e
distance between y^e lower part, & y^e body of
y^e Testicle, y^t we may be in no danger of
wounding it in y^e operation. Next I exa-
mine y^e course of y^e veins of y^e scrotum
y^t I may avoid y^e accident of blood getting into
y^e wound. W^th y^e Lancet (only make a cut
in y^e skin; not bigger than if I was letting blood
If I do not use y^e lancet, y^e skin is pressed
in w^th y^e trocar, & plunged in all at once
w^th a sudden violence, I now look w^th in
y^e orifice to see y^t no blood vessel prevents
y^e taking y^e trocar & making a reasonable
allowance for y^e thickness of y^e skin &
wound. I lay y^e Instrument in y^e hollow
of my hand, & regulate y^e depth by my
fore finger, & direct y^e Instrument
in a slanting direction, making y^e hole
upwards, at a different place from y^e
natural

punctum of the skin; that from the oblique passage
acting as a Valve there may be no entring of the
water, nor the air get in, then turning it inwards
& now by the want of the resistance, when past
within the cavity of it, when I draw back the
perforator, pushing in the Canula, & using the
discharge I make a pressure with my ~~finger~~ hand
on the vacka, which is material. Then in a common
abscess, the matter comes out at first pure, but
towards the end bloody, the blood pushing out
from the vessels when relaped, so this may
follow water here, & in other cases it follows
matter. We therefore suspect the part, & by me
feel that the whole of the water is not drawn
changed, & that it does not touch the pipe
it may be owing to the end of the pipe pressing
against the side of the vacka, or body of the
scrotum, so we enter a probe & push away the
matter that the whole may be discharged, then
pulling my finger on the part we withdraw
the Canula, & immediately apply a proper bandage, as a compress of flannel dipped in a
solution of Saccharum Saturni, & spirits
& Vinegar, & we support this with a T. Band-

(age

any Sanguine patient to Bed for 2 or 3 days at least, keeping him on a cooling Diet, whereby the collection will be found not to return or soon so much, & coal contracting, so as to resist great. by the further dilatation. Whereas, by neglecting it, pushing & compressing it readily fills again w.t water & blood, & an Inflam.n coming on may prevent the radical cure from being done w.t tolerable safety.

But suppose that the patient is willing to submitt to a radical cure, i.e. to such an operation, as by its consequence produce an Inflam.n adhesion of the Vaginal coat to the body of the testicle, what ought to be the general manner a Surgeon employs in manner of doing it. There are various proposals for this purpose, some of which it may be sufficient to mention in a very slight way. Some propose to throw in some irritating liquor, as wine, or spirits of wine, so as to produce an Inflam.n or to introduce a hard body as the Canula of a trocar which is to be left there, or a bougie. But the objection to these is, That the Surgeon has not the management of the Inflam.n afterwards in

his

his power. The other methods proposed are y. appli-
cation of Caustic, y. making an incision, or
y. introducing a Setan. Now first with re-
spect to the application of Caustic, there are
two methods in which it is done. The one is
with y. view of supplying y. place of y.
Incision, in a timorous person, hence it was
applied nearly the whole length of the tumor
to make a free opening. My late years. M. Le
Dran used to apply it to y. lower part of y. tumor
y. breadth of C., which makes an Section
double y. Diameter, & it lies on for a certain
number of hours. Now that beyond doubt very
few, perhaps none a considerable number
have been performed in that way. I would
prefer the other methods of y. incision, or
Setan, as being more certain. For in a case
which occurred in our Infirmary, where that
method had been practiced, y. Disease return-
ed, & yet at that place y. Cord had been
divided & there was a complete adhesion
of y. external coat to y. tunica albuginea
y. Testicle.

We only remains then to compare y.
method

method by incision, & that by y^e stelan. I must acknowledge y^t I have not had a sufficient opportunity of seeing y^e stelan tried in a proper way, that is merely a stelan, for when we first make an incision, & afterwards press it, we (de ipso vano) do where we dilate the whole parts only with further trouble to y^e patient, & as with respect to y^e incision, y^e consequences if it have been extremely exaggerated. Mr. Thompson of Violey & Jesus, unsuccessfull twice which were treated in this manner 10 years ago, & which was rather to be put down as uncommon, than as a rule by which we are to be guided. My Father had this operation done 30 times, & I have directed it in 20 more cases. My Father alledged y^t none of his patients ever seemed to be in imminent danger, & that y^e cure did not fail in a single instance, & in every one I have where I had y^e direction of y^e patient, there was no degree of danger, nor of pain (I am) convinced, y^t taking y^e most favourable representation of y^e stelan by Mr. Hart I am doubtfull, whether in y^e case of Diarrhœa

Incision of symptoms be persistent & of Cure
is meer to be expected upon, Previous we ace
epacity of state of ye Testicle, we are in no
danger of running into a mistake whereas we
may pass a Solan, where there is water indeed
indeed in ye Vaginal coat but ye testicle itself
ye same time in a Schirrous, or Cancerous
state

The method by ye incision in this
of ye Hydrocele is small & even ye pat we
can judge that the Testicle is in a sound state,
we would do ye radical operation at once, pro-
ding ye patient be convinced of ye small chance
he has any other way. But if ye patient
thinks ye letting out ye water will do, we
would do this & examine ye state of ye testicle
in two or three months, ye water collects again
as if ye swelling, is large, I would not do ye
radical cure immediately, but would [illegible] of
ye water, & do ye radical cure before it is collec-
ted again in ye same quantity, ye Danger are
being in proportion to ye size of ye water, by
this way we satisfy ye patient, that there is
no other method of Cure & we know ye state

of y. testicle. In performing y. operation we examine
carefully the Vessels most y. strain, or y. vessels
in general arising any large vessel. Make
an incision not y. full length of y. tumor
leaving a certain pouch or bag at y. bottom of
y. testicle. Some begin w.t accommon bistoury
at y. top of y. tumor, & carry it down, then w.t
y. same Instrument we divide y. tellular sub-
stance, avoiding y. Blood vessels. Some suppose
Suppose that the Eyal presents, & Divide
that with the same Instrument, or what will
answer as well, I take accommon lancet, or
a large lancet, & have ready a Director to
be introduced, but if I can easily put in
my finger, it is y. best conductor. Some
suppose that this is done, whilst y. water
is running out Introduce y. probe, & lay
open y. rest of y. Bag w.t y. knife, made
straight, w.t a probe in y. end of it, that
it may not hurt y. Epididymis at y. top of
y. testicle. If any large vessel bleeds, I
take it up w.t y. needle, then apply com-
mon dressings lightly between y. lips
of y. wound. The operation is generally
done

come on ye lower part of ye Leg, & if there is no bleeding in ye evening, leave a poultice made w^t Bread & Milk, & oil to be applied, but if ye swelling relaping there may promote ye discharge, w^t ye help of ye poultice till next morning, & sometimes a poultice during ye Cure, consuming ye patient, & leave him to observe ye Antiphlogistic Course, & if he is plethoric, leave him to be bleeded. Their critical attention to these circumstances renders ye Cure much more easy & easy than it has been generally represented.

But suppose in ye w^t H^y I tell we consider a delay, there is an easier method of introducing it than that which he describes, He use Heister's bent trocar, or a flat canula w^t a long canal pierced perpendr, & we make ye puncture of ye skin w^t ye canal, of ye tumor projects considerably, a knife Surgeon may begin on ye upper part, but le avoid ye testicle, we must rather puncture ye lower part, Having entered ye canula within ye water we draw it, & perforator, & allow ye water to be discharged

yd then ye bring yd instrument to yd upper end of yd tumor, where we are to perforate it, & holding it in that situation, we cut in upon it, & bring it out. Now in Hernia in this way, we tie yd Scton to yd end of yd Perforator & draw it back again, but it is just the same to have a common probe wt yd proper Scton, will make this with Threads yt for wearing but being an Animal substance it will soon wear thro Linnen: We may it well & then oil it, enter it wt out further pain to yd patient, & taking hold of yd Scton, we withdraw yd Canula & leave it in yd wound, & would actually here do in yd former case yd poultice, & confine yd patient to, yd horizontal posture, & absolute rest. I'll propose after ten or twelve days to pull out Threads, but I would rather allow yd Scton to remain till there is a Separation in every place, except where yd Cure passes, when we wt draw it.

Sect: XI.

After shewing yd method of operating in general in Hydrocele, yd only circumstance farther yt need to be added is, that where yd

yt water is collected in a large bag, or bags in the Spermatic Cord, or in yt cave of yt preternatural moysted substance of yt Cord. Here is no caution to be used, in passing yt Instruments, or in making yt Incision, for yt Cyst may be as readily behind as before yt principal spermatic vessels or yt Vas Deferens. So we must take particular pains to discern yt course of yt cord by feeling wt yt hand, examining it part with yt clear light of yt Sun, or a candle in a dark room. But as yt light renders yt Blood vessels as well as yt Cyst in a great measure transparent, we only get a kind of resemblance from examining in that manner Having determined as nearly as possible yt situation of yt Cord, we make yt incision first thro yt skin, then that yt Cyst, — ding especially yt Vas Deferens. — The next Complaint I shall consider is yt

Schirrus of the Testicle, or yt swelling of it, which is commonly named so yt disease is supposed to be of that nature, which degenerates into Cancer, it is called Sarcocele. But if yt swelling be occasioned

coroina from a Generrhœa; an absurd name
has been introduced of Hernia humoralis. The
testicle swells then first from a Gonorrhœa.
The cause & ye manner of ye swelling were for-
merly explained. Next blows may produce
a hardness, which will begin in ye part inju-
red, whether it be ye Epididymis or testicle
& lastly ye swelling may begin from internal
causes, when ye swelling generally begins
in ye part making ye secretion; in ye prosta
glandulae part, or body of ye testicle. Have
I have seen a kind Schirrus begin in ye Epi-
didymis. How when ye swelling is produ-
ced from ye venereal disease, even that it
does not subside in ye ordinary time, yet
ye long continued use of Mercury generally
complicate ye case, & it seldom terminates
in Cancer. But if ye Viscane proceeds from
a blow, ye cure is much more uncertain
tho' I have seen cases of considerable swell-
ing attended wt pain discussed by ye long
use of Mercury, even where ye testicle
had been tied for some months wt'out
any suitable effects. If it proceeds from
an

an intimeum cause, i.e that of ye cavcave is of that kind, which naturally runs from Scirrus to cancer, if ye constitution be tolerably sound & ye swelling moderate, wt little pain, & not very unequal on its surface, we make a trial for sometime of such medicines, as have ye effect of discussing Scirri, & many will bear ye cicuta, perhaps for ye most part to little purpose. But if ye swelling be considerable after making a moderate trial, we ought to have recourse to ye Surgical operation, ye testes ought to be extirpated. But before proceeding to ye operation, I would observe that there is a danger of mistaking in some cases a hydrocele for a Scirrus, & again in others a Scirrus for ye hydrocele, especially if there be ye complication of water contained in ye vaginal coat, which is a very common consequence of it, ye Scirrus produces hydrocele water collects after ye scirrus has continued for some time. For ye most part we distinguish ye hydrocele by ye symptoms mentioned at our meeting yesterday. but in a few cases ye sack & ye tegumenta become very

very thick, & unequal to ye feel. I may here mention a very instructing case, that occurred here 3 years ago, & in which Dr Cullen, Mr Howe & I were consulted. A patient came from a distant part of ye country, wth a large swelling of ye testicle. The testicle on one side was supposed to be scirrhous, it was as large as ye fist, hard, & unequal. On ye other there was evidently a collection of water, but at ye upper & posterior part of ye tumor, there was an ulcer which was supposed to be cancerous, & which affected ye body of ye testicle itself. On examining ye case wth all possible care, we were not able to draw a certain conclusion wth respect to ye nature of ye case, but we agreed to treat it in this manner, That as ye ulcer might be owing to ye very great size of ye swelling & ye little care ye patient had taken of his complaint, but had allowed his part to rub on his cloaths, we should draw off ye water by a puncture of ye small trocar, & examine ye state of ye testicle we found that it remained sound wthin

ye

yd. cack, & that yd. ulcerated part was at some distance from it, & by taking of yd. suture & confining yd. patient very much to bed, yd. ulcer healed of itself in about 30 days. We then proceed to treat yd. other side, We hyped to find it likewise a hydrocele, & agreed to proceed as if it were, & that if yd. Testicle was schirrous, we would extirpate it: we found a most unusual thickness of skin, & an appearance of dark brown matter, like coffee, & blood extravasated, mixed w.t water & yd. Testicle round, & yd. cure was compleated w.t out any bad accident in yd. space of 3 weeks, when yd. Incision was made on yd. other side, & that compleated in about yd. same time, save we see yd. danger there may be of violating hydrocele for schirrus of yd. testicle. Now as yd. other hand Surgeons are apt to trust to yd. first appearance & feel of yd. part, they suppose a hydrocele & examine no further, whereas there may be a complication, which may be discovered by a more accurate examination, we distinguish yd. bulk of

yd.

yt testicle enlarged, hard & unequal, & a much greater quantity of water is necessary to conceal yt substance of yt testicle than yt natural testicle. In joining these matters to yt manner in wch yt disease was produced, yt pain attending it, yt weight of yt part weighing, yt tumor in yt hand, we may be pretty certain wt respect to yt state of yt part. But yt safest practice is to proceed in such cases, as if we were to treat a hydrocele, which is attended wt very little disadvantage as yt Incisions in both cases, are to be made in yt same manner, only instead of at once compleating yt Incision, you make it half yt length, examine yt vaginal coat, making a puncture in it & joining a substance you compleat yt Incision.

You are to yt steps of yt operation they are really so simple, that I do not think there ought to be any dispute about yt manner of operating, we make an incision yt whole length of yt diseased part & higher still if we may be at full liberty to do, to lie upon yt hard, & yt natural water

lucor

blood after the varicose is removed. I need not say that the incision must be undertaken, if the spermatic cord partakes of the varicose beyond reach, but I would not be averse to performing the operation merely because the spermatic cord was considerably enlarged, for in every enlargement of the testicle there is a proportional enlargement of the cord. That therefore the hard varicose state of the cord, attended with pain, justifies the operation, yet if it is not there is merely an appearance of an enlargement of the vessels, or perhaps only a slight effusion of water into the cells, in the substance of the vessels, we would perform the operation. Suppose then I find that I am certain of the case, I make the incision into the testicle & finding it diseased I make my mind on from the thing, commanded to the bottom & in doing so, there is no occasion to push up the skin, which is very commonly done, I make the incision exactly at that & more exactly in the proper place & there is not the smallest danger of cutting the spermatic vessels. Now it is unnecessary

having

passing one thin, to fall to ye part of ye skin, from ye spermatic cord, all we want is to be able to pass a ligature around ye cord which we do with a large thread & needle as we mean with it to make a tourniquet in ye time of ye operation, or if ye cord is not enlarged, we mean to confine ye blood after ye operation; & to render it unnecessary to take up ye vessels singly w.th needles, & a large ligature does not only insure ye part so much, but making ye ligature Receiver capable of leaving out ye nerve, meaning ye vas deferens. But I would propose that you should on purpose take it in, as there are considerable branches of ye spermatic artery running along it, & it is not more sensible, than ye rest of ye cord. Tying tied ye ligature w.th a running knot (divide ye cord transversely w.th out separating ye vessels first from ye cord, & from ye testicle, for ye operation is perfected easy afterwards, besides it renders ye operation tedious, & ye bleeding not so well distinctly seen. We mean ye cut about

half

half an inch below y^e ligature, & by pushing y^e
finger behind y^e bone & Vessels, make them all
slide back. The Cellular substance is so loose
that y^e Surgeon might with y^e hand tear out
y^e Vessels, but laceration & contusion ought
to be avoided, as producing more violent symp-
toms, than follow cutting y^e Cellular sub-
stance. So we dissect y^e Vessels from y^e
skin, & here y^e Surgeon is much y^e better
of his assistant holding y^e skin w^ch one hand
while he holds it w^th y^e other, therewith
all such help, there is no particular diffi-
culty in doing it. Immediately after mak-
ing y^e separation, y^e Surgeon looks for
bleeding vessels, & takes them up as quick-
ly as possible, taking hold of them w^th a
common forceps, & pulls them out & ties
a ligature round them, for if he delays (doing
this) y^e patient faints, y^e blood clots in y^e
orifice, & in a few hours after y^e Suppura-
tion applied breaks out again.

Nota w^th respect to y^e Cord, if it be
small, y^e ligature is to be left, & a run-
ning knot will keep it well enough, as
y^t

that we need not even allen yt knot. When patients have suffered pain, it may owing to yt cord being drawn wt too much ampity & nerves being bruised, or yt ligature has been applied when yt spermatic cord was remarkably enlarged, when ye ligature may become proper, & it may be better to loosen it, & to give yt patient some cordial to make it take yt resolv blood & obscuring yt bleeding ensue to draw them out singly wt yt tenaculum & tie them; & in a large Scrotum where every branch comes to be as large as yt natural trunks are, you still however leave yt ligature for 2, or 3 days, that if any arteries should not have been tied, & if any ligature slips we may use it again as a tourniquet, but it is by no means necessary wt some to have recourse to have recourse to a machine for pressing yt spermatic cord against ye os pubis in yt operation. I have taken no notice of removing any part of yt skin either in this compleint or in yt hydrocele for however large yt swelling be, if yt skin is sound, it is unnecessary to remove

it

it. But if it is (discovered in time) to remove ye diseased portion, beginning & ending in an Ulcer by cutting out a section like an Orange. Then ye Surgeon sets to work to divide ye lips of ye wound, & lays in lint to prevent ye joining, & an abscess forming. After a granulation is produced, we take less pains in laying in ye lint, & as soon as ye bleeding is stopped, we should cover ye lint with an Emollient poultice that is in ye evening, & next morning. The next complaint I shall consider is called

Fistula Ani by which is understood not exactly a Fistula, but any considerable abscess about ye extremity of ye Intestinum rectum. It is very evident that ye cellular substance surrounding ye rectum & ye rectum itself are particularly exposed to disease from ye nature of ye contents, & from ye unequal distension to which ye part is exposed from costiveness &c.

Next you will recollect ye skin about this place is remarkably hard, ye Cellular substance is in loose, & ye quantity of fat very considerable, & hence a ready

formed

ye nice opinion far from ye heaviness, & from
ye haviness of ye skin getting out wt difficulty
& ye matter is allowed to clog more, then ye
next part of ye body it falls down upon
ye sides of ye Intestinum rectum, & ye skin
receiving more than ye gut, it may form
a passage into ye gut, so ye part of ye matter
or ye whole of it will be discharged by stool
the matter most readily forming on ye outer
side falls in along ye gut, till it is stopped
by ye close connexion wt ye external sphincter
of ye anus but wt ye testimonies, so it needs
about ye top of ye sphincter. But where ye
matter contained within ye gut forms ye com-
plaint, shall fall down till it is stopped by
ye contraction of ye sphincter, & hence where
excisions are formed, you will generally
find them in ye cavity of ye, about ½ inch
from ye verge of ye anus, just a little above
ye inner, or higher part of ye sphincter ani
As soon as a suppuration can be discover-
ed in ye button at ye side of ye anus by
ye pain, ye hardness of ye part, & ye
increased pain on going to stool, ye Sur-
geon

geon ought to examine carefully ye situation
wt out, & to introduce a finger wthin ye rectum
& being satisfied of ye place, he ought to make
an incision upon it, the at a convenient
distance within ye anus, & that no fluctuation
can be discovered, & he is not to wait for
a fluctuation, otherwise he may come too late
& ye cause of ye Gut be encreased. If any known
disease have been ye occasion of ye abscess, whilst
ye Surgeon begins his operation, he applies ye
proper remedy, as if from a venereal complaint,
he must use Mercury. Now let us suppose
yt upon examining such an abscess, we
find that ye matter have been lodged upon
ye coat of ye Intestinum rectum, yt the outer
part of it is laid bare, and we to compass our
general direction, to make ye abscess or
fistula complete by perforating ye coat
of ye rectum, then cutting down ye side of
it, & laying ye whole cavity in that manner
open? We are by no means to do so
but to be guided by circumstances &
suppose that this rule how exact in
some particular circumstance, that
if

y^e matter has actually made its way into y^e rectum & a fistula is already formed, you will not easily cure it, without such an operation, I dare assure you that even Surgeons have tried to heal abscesses, supposing that there was no communication, when in reality there was one, from y^e difficulty of finding out y^e obscured part, & one must probe very carefully sometimes, as y^e hole is not longer perhaps than a grain of, but generally round it, we can discover a hardness, & y^e blunt part of y^e finger sinks in at y^e middle of y^e hardness, Now we are not rashly to open y^e gut, & we may complete y^e cure without doing so, thus putting one finger into y^e abscess, & another into y^e anus, I have found nothing between them but y^e coats, & yet cures were absolutely compleated.

Sept^r 1st we supposed that there is a hole in y^e side of y^e Intestinum rectum that there is a real fistula, in what manner are we to perform y^e cure? We first determine y^e place of y^e hole, &

me

we ought to make a mark that whilst a probe is introduced into y^e abscess, we introduce y^e finger of y^e other hand into y^e rectum, otherwise we may be led into y^e mistake of imagining that y^e fistula is of great length, when y^e probe has passed thro' a very short fistula into y^e cavity of y^e Gut: Of y^e Sinus of long & great length, as to 4, 5, or 6 Inches upwards towards y^e Os Coccygis, it will be difficult to make y^e cure, y^e case to be of very considerable size, yet if you make a free incision below & give a discharge provided y^e bad habit be corrected by a mild & vegetable diet, w^t y^e barley taken largely a very deep Sinus will heal up, & if y^e sinus is short, & y^e habit tolerably good, y^e cure may be made w^t great safety to y^e patient & great ease to y^e Surgeon. The method of operating ought to be very simple, may you will often be called to cases that appear very complex, & which yet are very trifling so you will find holes half round y^e Intestinum rectum & yet all coming from a single hole, we search for y^e

eptent

colent of ye cavities, & we ought not only to make
ye injection from ye Anus & ye rectum, but
in ye reverse way, especially where ye passages
are oblique, & act as Valves.

Suppose not that we have determined
(not) ye nature of ye Complaint, & that we have
found it to be simple, ye reputation which
Hamo's pipe acquired, is a proof that such
will cure of themselves, where there is a free
discharge. But suppose that ye complaint
continues, & there is a necessity of an operation
are we to imitate Le Dran & other Surgeons
in cutting out ye (diseased piece)? They advise
(duce) a funnelled probe into ye fistula, & from
it into ye Gut, then they take a piece of
silver on account of its being very flexible
& making it sharp in ye point, they
run it in ye furrow of ye probe till they
get as high as ye fistula, then they push
ye point of ye sharp probe higher than
ye funnelled one, & bending ye point they
bring it out at ye Intestinum rectum
receiving it upon ye finger, & having
now a hold of all ye diseased portion

they

they cut out y^e^ fore w^th^ y^e^ knife, proceeding on y^e^ supposition y^t^ the fistula is become callous, so will not granulate & heal, but experience has exploded this opinion, & has shown that there is no necessity for cutting out y^e^ diseased portion, nor is it in many cases practicable, so where there are holes on both sides of y^e^ buttocks, & an injection thrown into y^e^ one runs into y^e^ other, y^e^ whole circumference must in this case be cut away so we must only think of a method of soliciting y^e^ fistula open, & of throwing y^e^ mundic into y^e^ same easily w^th^ y^e^ abscesses or fistula so when exposed to y^e^ air & the spongy callous substance granulates & fills up Surgeons speak of such membranes steppings of, but there is a granulation from y^e^ surface, w^th^out any discernable separation of parts, so that membranes which have not many vessels, when exposed to y^e^ air, and assisted very to produce granulation of flesh freely, as you must have seen this operation frequently done by a simple incision w^th^

in

is recommended by Pott, in a very good manner
for this subject, & he recommends a concave
edged Bistoury with a blunt point, this is to
be introduced into the fistula then into the In-
testinum rectum, descending the point, then the
Surgeon endeavours to turn it out, & cut to
that the point with it. But there is another
& perhaps a better Instrument recommended
by Heister for this very purpose, the probe
pointed, you introduce it into the part
patient, & you have him held of it, & you
can introduce the blunt point much better
than a knife into a fistula, as the probe
is made Elliptic, so you need not put it
down, & turning it out at the anus, & that
before you have brought in the knife, &
thus you have him held of this In-
strument both by the point & hilt, so can
at once shorten the operation, before
the patient is well aware, & the operation
is begun, it is finished. If the disease
run high, here is a method I have caused
to be practiced, you take a common Gorget
make it quite smooth, & even like
a

a tube, & introduce it into ye. rectum, defending
ye opposite side of ye. rectum, you then take ye
common knife, introduce it into ye. fistula
& you cut it safely & certainly, & ye. side of
ye. Gut is put upon ye. stretch, or we might
introduce a bit of wood, & cut upon it. But
we should not practice higher up than we
can reach w^th^ ye. finger, i.e. about 3 inches
or so, Now after we have done such an
operation, a good deal depends upon ye. dress-
ings applied, they must neither be applied
so hard as to irritate ye. parts & inflame them
highly, nor to stop ye. passage of ye. faces,
nor must they be laid in so tight, as to
allow ye. excrement matter to get between
ye. dressings & ye. fistula, which would
prevent ye. granulation, & filling up
of ye. part, so they must reach ye. bottom
of ye. wound. The patient ought to be
kept loose in ye. Belly w^th^ a little lenitive
electuary, avoiding ye. extremes of costive-
ness, & of too great looseness by giving
opium, & if ye. stomach will bear it,
& ye. constitution is relaxed, we give ye.

Bark

Bank freely which discovers ye part to heal.
Ulcers may be compleated in 14 or 3 weeks, but
if ye Fistula runs high up and not always able
to promise success, but ye patient may die of
ye discharge; at ye same time, even where
ye discharge is very considerable, if there is a
free opening beneath, ye patient may recover,
Never consider ye management where ye natu-
ral passages are shut, or improperly dilate-
ted. There have been some few instances
where ye lips have been found joined toge-
by the by proving that a fistula can kill wi-
out swallowing. This then is ye most
simple operation, requiring merely an inci-
sion, & ye Saliva may keep ye lips from
joining again. Next at the mouth of ye
Vagina naturally there is a membrane
called Hymen, ye appearance of it however
varying much, Now in some few cases
that membrane is complete, so that when
ye woman comes to menstruate ye menses
are retained, if ye case is known ye same
is perfectly simple, we cut a circular piece
as it may be sufficient to divide it by a

crucial

crucial Incision, from 4 to 6 ounces of blood have been retained from that cause. Kept y. Nostrils either one shut, or y. Small finger according to Children's reception y. closing of the one when y. Child is obliged to breathe thro' y. mouth. Here we first cut y. spermatic, then introduce a bit of Bougee to keep y. sides from uniting again. Kept suppose that y. anus is shut, but y. place evidently marked, here y. case is perfectly similar, but in some few cases y. Intestinum rectum terminates in y. Vesica urinaria, or in aliud sacki; & there is no vestige of y. Anus, here we make an Incision, dilating y. skin & cellular substance upon y. Canula, in order to promote regrowth of flesh, we keeping y. Canula in during y. Cure.

Sect: 103

Treatment of Hernia

You all know y. meaning of a Hernia, we may conceive it to be a protrusion of y. bowels from their natural Cavities, but still remaining covered w.t y. common tegumentes, & even for y. most part w.t y. tegument they had

had w^ch^in y^e^ natural cavity. You likewise know that y^e^ Bowels of the Abdomen are chiefly, tho' not solely subject to y^e^ Disease, & you can determine y^e^ place where Hernia will most readily occasion happen, viz^t^. when y^e^ Integuments resist y^e^ least, generally owing to y^e^ passage of a Cord of vessels, or of nerves which necessarily carry out w^t^ them a loose Cellular substance, to allow of their easy motion. They may therefore happen at y^e^ upper part of y^e^ Abdomen, y^e^ Abdominal Viscera may be pushed into y^e^ Thorax, w^ch^ y^e^ Oesophagus & vena cava, or aorta &c into y^e^ intercostal & y^e^ containing muscles at y^e^ back part, where y^e^ obturator vessels go out. But 3 species are y^e^ most common y^e^ Hernia of y^e^ navel & y^e^ external oblique what ought to be called y^e^ annular inguinal. Next that where y^e^ large vessels of y^e^ Thigh pass out at y^e^ opening behind y^e^ tendon of Ligament of Fallopius, & over which y^e^ Inguinal glands are situated. The 3^d^ species is y^e^ Umbilical. Now of these three, y^e^ annular inguinal is by

much

much y. most frequent; the next most freq-
-ly y. Inguinal or Femoral. For y. umbilical is
seldom observed in Men, or in Women, who
have not had Children, but it sometimes
forms during pregnancy, y. distended uterus
pushing up y. Bowels, & thrusting them
at y. top of y. Abdomen: Comparing y. two
Sexes, women are more subject to y. Femoral
or Femoral Hernia, on account of y. size of
y. round ligament of y. Uterus, & from y.
length & looseness of y. Tendon of y. external
oblique, from y. breadth of their pelvis.
Perhaps there 3 kinds, but especially y.
Inguinal & Femoral happen y. more rea-
dily from y. looseness of y. peritonæum
at y. bottom of y. abdomen, where it is
not covered closely by tendinous matter
perhaps to allow y. free motion of y.
Vesica urinaria, from which circumstance
as also from y. depending situation there
y. peritonæum yields more readily. ()

The distinguish Hernia from
other complaints, & particularly from
Hydrocele, by attending to y. cause, y.
sudden-

indolence of y. appearance, y. pain, y. heat
of y. part which if y. Intestine is naturall
in different from that from water contained
in y. sacks of a hydrocele, may we feel y.
motion of y. air, & often can hear it, if y.
omentum is included, we distinguish it
from ye inequalities & softness of y. tumor
too is continued from y. opening in y. belly
& it is affected by a change of posture
& y. Surgeon may perhaps have it in
his power to reduce it. But if he cannot
do so & y. part inflamed, y. bowels come
to be affected, vomiting, hiccough on y.
patient in all y. same time bound in
y. Belly, y. passage of y. faeces being
interrupted. We can neer readily conjecture
y. particular parts of y. bowels y. will
naturally form such tumors, that none of
y. abdominal Viscera are free from y. di
sease, as they are all supported by doubtings
of y. peritonæum, which yield suddenly
or are drawn out gradually, but for y.
most part, y. under part of y. small Gut
testines, y. Intest: ileum, will be y.
subject

subject of y^e Disease, not only being y^e Tumour but having likewise y^e Sarcocel Mesenteric.
Nor wd we would suppose y^t the Omentum may very probably be included, & if it should, it may carry wth it y^e Large arch of y^e Colon & these Parts from whom experience are found to form y^e Tumour in Herniary cases.

Nor wd suppose y^e Disease to happen suddenly, & that y^e Surgeon is called, he ought to attempt y^e reduction, wthout even waiting till he has let blood, or performed any other kind of preparation, for a Delay of hours, or even minutes may bring on Inflam^n & render y^e reduction more difficult, we y^e first attempt is to put y^e Tumour back, after laying y^e patient in a proper posture, But if he finds a difficulty in doing so, he is to let blood freely, If y^e Mesentary Canal when inflamed is found to require N.S. perhaps more than the other Organs of y^e Body, y^e necessity of this must be still more evident, when it is not only inflamed, but mechanically dragged out of its place, & pressed upon, we must

to

to let y. blood w^t as my great fear ... & y.
same time we put y. body, as as to bring as nearl.
as po. to take off y. tension of y. parts, i.e. we
make y. patient sit erect, or stand, we open
a large orifice in y. vein, draw y. blood as
quickly as possible, & loosen y. ligature
instantly, & when y. patient remains in
y. fainting fit, we attempt y. reduction.
Whilst we wait, besides repeating y. bloo.
letting, we assist by proper fomentations
& by injections thrown into y. body. When
y. Surgeon is about to repeat y. operation
y. posture of y. patient ought to be horizon
tal, y. shoulders & y. pelvis raised a little;
we as to slacken y. Belly as much as
possible. The Surgeon then applies his
hands to y. tumor, & instead of making
a general pressure, he attempts to reduce
first what may have fallen out last.
Whilst he waits, he ought to lay aside y.
effect of proper regulation; y. openings
should be made y. highest part of
y. abdomen, when y. weight of y. bowels
will have a considerable effect, may
may

may ~~never~~ pull y^e scarf into y^e abscess when
it is not in y^e same y^e Nurse is to propose
to doctor. Supposed that we still fail, we
must before proceeding to y^e operation by
y^e further assistance of Injection mixture &
infusions, or of any means y^t can produce
an Intestine motion, which has been found
to succeed, when all other assemblies more
or less unsuccessful, so we must pick out some
patients of Colonel & Chaplain & see what success
patients by injections, particularly y^e smoke
of Tobacco has been recommended. Now this
I have continued an Instrument for y^e purpose
I have used it, yet I am that I am not
convinced that it do effects one much greater
than an infusion of Camomile with a few grains
of Cayan pepper dissolved in it. But as
some are of a different opinion, I shall
show an easy method of managing it in
Place of common Anatomical Syringe
a double flesh Cock, I have caused to be
made a Box of Iron for containing y^e Tobacco
a plate of Iron perforated to allow y^e smoke
to go from it, now joining thereto, y^e Pipe

y^e

y^e Nozzel of y^e Syringe, fill y^e Syringe w^th
smoke, then turning y^e stopcock & pushing
down y^e piston, y^t air goes out at y^e side,
it is conveyed by a flexible tube into y^e bottle
(w^ch if we wish to heat y^e smoke still further
& to make it stronger, we need only change
y^e situation of y^e pieces, fitting y^e syringe
to y^e Box, & put a head upon it), then shut y^e
double close cock upon y^e top of y^e Box
now if I draw y^e Syringe, y^t air passes
thro' y^e Tobacco into it, then turning y^e
stopcock, & pushing it out again, it passes
thro' y^e Tobacco again, before it gets to y^e
fire, & soon at length draws it in in
any quantity. One person manages y^e close
cock, & another y^e Syringe, whilst a third
conveys y^e smoke w^th in y^e gut by a wet
cloth put round it. An ingenious Gentle-
man instead of y^e Syringe, has made
an apparatus w^t y^e Bellows, meaning
I was told thereby for giving Injections,
for blowing up y^e Lungs for recovering
drowned persons. Note y^e Syringe would
answer likewise very well for y^t purpose

&

& in giving y^e Injection you must in a more
equable manner w^th it. Heate such an
Instrument as I had already made, the
vacuum an eighth, which is no doubt more
handy, & makes it of less. This Boy is
likewise made w^th Leden, but w^th an im-
provement, he has a peculiar plate both
at y^e top & bottom, whereby y^e air passes
equally thro' every part of y^e stretched Bladder.
&c. It may be worth shewing another
Instrument here, viz^z a method, by which
we can ourselves manage an Injection
The Syringe is filled w^th y^e Injection
& y^e patient sits upon y^e pipe, as we might
do y^e same w^th y^e flexible pipe. (

I shall next endeavour that this me-
thod likewise fails we ought then to have
recourse to an operation, by which we
mean to take off y^e mechanical pressure
or obstacle upon y^e Bowels, made either
in y^e outlet from y^e Abdomen, & next
after doing so to replace them, & y^e space
beyond doubt ought not to be delayed so
long as it is frequently, this is impossible

now

however (determined y^e time) that ought to
intervene between y^e division forming y^e
operation, for that must vary according to
y^e nature of y^e accident, producing y^e disease
y^e quantity & kind of bowel that is protruded,
(if y^e omentum comes down that serves as a
mechanical protection, that in a fresh incision
cou, it may entangle y^e intestine, & not much
depends upon y^e natural vigor of y^e subject,
openings, upon y^e age, y^e constitution of
y^e patient, & y^e management of y^e case, but
upon y^e whole if y^e attempts fail, & there are
no symptoms of mortification we must to
operate. And I suspect that independent of
y^e immediate effect of y^e part out of y^e
body, y^e distension of y^e bowels will
have a very dangerous effect, as they come
to lose their tone, & a mortification may
begin higher than y^e place strangulated
Next supposed we are to proceed to y^e
operation, I shew you a case of hernia
w^t y^e mouth of y^e sack open, y^e epiploic
Cord passes down behind y^e sack
which is its common situation y^e

Peritonæum

Peritonæum, & pricked out ye same name, & passe
a probe from ye mouth of ye wound, through
ye Peritonæum, that shall be a possible Case
that ye Cæcum is a good deal thicker than
ye Peritonæum with in, & in ye Semilunary valve
you see ye Testicle, included in ye vaginal
coat but if ye finger receiving ye Testicle
have not shut, then ye bowels are in con-
tact w.th ye Testicle, & this have led some
to imagine that ye cause was rather a
Disease of ye Testicle, than of ye Bowels

Let us now, supposed ye operation,
necessary, & proceed to consider ye wound
also, & shall take ye Inguinal hernia
for an example, being by much ye most
common species, ye place ye patient lies
horizontally on a table, w.th a pillow under ye
head & shoulders, & ye thighs raised by assistants
to relaxation ye parts, & ye Surgeon places
himself between ye patients thighs, he
begins an Incision w.th ye common Scal-
pel w.th ye modern handle, & he begins
it about an inch above ye ring, in order
to bring ye ring clearly into view, & con-

tinues

since yt Incision to yt bottom of yt hernia
calling yt skin only. Now, in being that there
is no occasion to take up yt skin (double
which lays time & does not befoul yt grain
yt incision is not so exactly in yt stricture
you would wish to have it. After ye skin
yt skin is proceed wt yt utmost caution, for
that if often happens yt water is kept in yt
hernia sacki, & gets between yt sacke & yt
bowels, this is not a common event, but where
there is water, it is in ye fundus of yt sacke
part of yt sacke, so behind yt bowels, which
being full of air, push forwards, ye assistant
yt by cautious abstract, & thus divide
yt cellular substance, shunning any vessels
yt may present, are are nigh divided
by Surgeons to open yt sacke, in order to
examine yt state of yt Bowels, then yt
omentum is drawn wt yt Intestines
& there is a suspicion of Its entangling
it, or if there is water in yt sacke
which needs to be discharged, this also
is necessary, but if yt case is recent &
there is not room to suspect this circum-
stance)

stance, we ought to take off ye stricture about ye
ring if possible w^t out opening ye sack, & then
to push back ye bowels, as ye telling in ye
air on ye bowels, in ye circumstance of ye
greatest danger in ye operation, & ye cutting
ye tendon in comparison of that of no
consequence, & besides ye tendon, we cut
another thing which is ye chief hinderance
ye contraction of ye neck of ye sack, what
shortning also ye bowels more than ye tendon
does, & in yt wch must portend, & ye opening
not so large as to allow us to thrust in ye
point of ye finger, so we are to attend to
this, & by slow gentle ways to cut thro ye
stricture, We then reduce ye bowels into
ye sack, pushing them back w^t ye finger
alternately, & thus we save ye patient
great deal of trouble. But suppose now,
that we find it necessary to open ye sack
we do it w^t ye same knife, & taking
a pair of common dissecting forceps, we
pull out ye membrane a little, so as to
get a hole made in it w^t safety, looking
carefully that no part of ye Bowel is
drawn

drawn out. We thus make a very small hole which will receive a common or furnished probe, or Director, we then raise ye vacta upon ye probe, & by pushing it against ye vacta, we are absolutely certain that none of ye Bowel is included, & thus we enlarge ye opening, till we can introduce in ye point of ye finger, w^t which we conduct & open it w^t safety, ye knife having a straight edge & blunt point which is better than a common edge, which is in hazard of allowing a part of ye gut to slide over it. We thus open ye vacta its whole length & lay ye Intestine fully in view. The next step is to examine ye state of ye Intestine, & of ye Omentum; & we ought not to cut ye neck of ye vacta or ring, lest ye Intestine may fall back into ye cavity of ye Abdomen, we me turn them over gently annexing ye finger w^t oil, & see that ye Omentum be not twisted round ye gut & yt ye vessels are in a proper state for being reduced. Next we are directed to divide ye neck of ye vacta & ye ring. Now I consider ye cutting of ye Tendon

a

in a matter of no consequence, as I would make
y. division. But that y. stricture is such
that by a general pressure we cannot reduce
y. bowels, yet taking them piece meal, it
is possible. But lest we in after y. operation
y. bowels may tumble again into y. wound
I would divide it, & after y. wound is compleat-
ed, y. suppuration is much y. same, whether
we cut it or not, as from every part which
is exposed to y. air, there is a granulation
of flesh, so we would not dilate y. rising
suppuration in y. finger, & along w. it y.
knife; & so divide y. parts gently, &
it is of no great consequence whether you cut
y. tendinous fibres transversely, or humour
y. slant. In y. same time we examine
y. rising, as one side of it may have grown
to y. other, & there may be two passages in
place of one. So in y. memoirs of y. Acade-
my of Sciences, we are told of a cave when
y. gut had descended on one side of a mem-
brane & was returned on y. other. Having
replaced y. Bowels, we make a cover of lint-
ing, softly a thick compress & Bandage.

We

If make ye stricture in ye skin only, but so much as to exclude ye air from ye top of ye sack, where it is contiguous to ye Abdomen y: ye Instrm!! may not run so high

I have seen several Instances, & many are described, where ye sack adheres to ye mem of ye Intestine: Now where we see ye top thin to be ye case, we ought not to cut directly in under ye ring, but to open ye peritonæum above ye stricture, & having got into ye cavity of ye Abdomen, we shd push & put it down, that ye ring, or, to get between ye sack & Intestine. But sometimes ye Bowels not only adhere to ye sack, but to one another, & here if ye adhesion be complete, we only take off ye stricture, when we have done all prudence admits of. But if ye adhesion is slight, we may make free w! ye sack & peritonæale ye Gut from it, you may encroach upon ye sack, but you carefully avoid ye Intestine, we keep between ye adhering Bowels into ye Abdomen, & as they are surely better w!out that w!out.

Mr

Next suppose a mortification occurs, how are we to treat it? If we are doubtful whether the mortification, have no sure symptoms of it, from the colour of the nail, of the nail &c. we should return the Intestines, for they look unnatural of a darker colour than is natural; for when in their proper place, they may recover imperfectly, whereas, if they remain it is almost certain death. But if there are clear signs of mortification, we give the patient (if very little chance of the remain We have instances where a portion of the Intestines have separated, & yet the patient lived, may where the two parts joined together, & performed their function. In one case of this kind the Surgeon only endeavoured to retain one end in, & wound to discharge the faeces by that, but he afterwards found that the patient passed the faeces in the ordinary manner, the other had been sticking to the wig, & the two had grown together. But suppose the gut mortified in a small part, we join the

ends

ends together with a stitch, as we do what is called a

Gastrorraphia. To sew the Stomach

take out a part of y^e Intestine, as we may suppose y^e bowel to have fallen out in consequence of a wound. In this case we examine it carefully, & see there is no holes in it, or that y^e parts are not entangled, & endeavour to reduce it, pressing y^e parts which fell out into y^e Belly. But may suppose that there is a wound in y^e Intestine y^t that wound is long with ways, to draw passes a number of needles & threads thro' both ends together, & process y^e wounded part at y^e wound of y^e Abdomen, but this should be y^e cavity of y^e Gut, so y^t it may be free y^e Glysters stitch. Suppose not y^t y^e Intestine is wounded transversal several Surgeons have tortured their Brains there to very little purpose. Some advise to put y^e Practice of an Animal with y^e Gut & to sew it in. But y^e manner ought to be this, you take a common needle & thread, & enter it from y^e outer side of y^e under end, & you bring it out at

y^e

y.e navel & enter it in like manner thro y.e other
end of y.e Gut, & bring it out again, then we
pass it within the inner end again, & bring
it out again, & making a few such like Stit-
ches round y.e gut, we do all that is in our
power, some Surgeons have proposed y.e
use of Pegs in joining up y.e Abdomen
but a common Suture will answer y.e purpose
better. But if a Discharge of matter is expec-
ted, let us vse y.e upper end & introduce a
bit of Tape into y.e under which may
out y.e air.

I shall add two or three words about
y.e other Hernia's. In y.e Hernia congenita
we avoid wounding y.e Testicle or y.e Sper-
matic Cord at y.e back of y.e neck, as it
is more in danger of coming in y.e way
than in y.e common case.

Next suppose that there is a Crural
Hernia, from y.e situation of it, just where
y.e Femoral vessels are to be found, &
where y.e Inguinal glands are placed, we
are in danger of violating y.e Peritoneal, tho if we attend to all y.e cir-
cumstances

cumstances, there can be no danger of such a violation. Here we make y^e incision as in y^e former case, an inch above y^e place that makes y^e strangulation, or y^e tendon, the steps are all y^e same here, excepting that y^e peritonæum is covered with a thin tendinous aponeurosis from y^e tendon of y^e external oblique, over y^e thigh, & some of y^e inguinal glands are placed there, we must divide a thin tendon, & avoid those glands, but after y^e sack is opened y^e incision is to be made as I have already directed, & if we use y^e knife w^th proper caution, there is not y^e least danger of wounding y^e spermatic cord, & or epigastric artery. I have advised up to avoid cutting inwards, that we may avoid y^e spermatic cord, & says that if by cutting outwards, we divide y^e epigastric artery, we can lay hold of it w^th a needle but y^e artery is very large, & from y^e principal trunk of y^e body. He dran again apprehending most danger from y^e cutting y^e artery, advises to cut inwards, Now from y^e situation of y^e parts, there is

not

but y. smallest (danger) of cutting either, it's in stead of going inwards, or outwards, we cut up towards y. umbilicus (dividing y. tendon transversely, & using y. knife like a lever), & we are to operate upon y. Umbilicus, we make y. opening where we best can, only we must have caution, as y. Bowels most frequently adhere here from y. divided peritoneum. Note there is no occasion in cases of such importance to mind y. situation of y. umbilicus after changed into ligamento but we cut where we have most room.

Oct: 10th

At last meeting in treating of Hernia it mentioned y. agitation of y. body, that y. patients body should be inverted, y. head turned underneath. The patient may be put on another (Back), w.t y. legs over y. shoulders, w.t y. face towards his back & y. body is not only to be kept for some time in that situation, but an agitation. I shew you an improvement on Petits knife for y. Fistula ani, made by Mr. Dodd Surgeon to Newton Hospital, y. point

in

is rendered much more flexible by being made of Silver, whereby the Surgeon can more readily turn it —

We now proceed to consider the Surgical treatment of Dropsy, & we shall first determine the seat of the water —

It is found to be diffused in the Cellular substance & the complaint is called Leucophlegmatia, a white swelling to distinguish it from Inflamy tumors, alluding merely to the seat, it is named properly Anasarca & the name explains more than Surgeons commonly conceive of the complaint, they imagine that the water is confined merely in the Cellular substance under the skin, whereas it has at the same time got in between all the muscles nay into the Cellular substance lying betwixt the fibres of each muscle, & we can even trace it to the membranes of the Bowels in the Abdomen it gets between the muscles & their fibres, from that to the heart & the Pericardium, from that to the Diaphragm & the Mesentery, in like manner in the Thorax it passes into the Interstices of the muscles

Dr

lar fibres, & intercolate, & then into ye cuticular substance at ye side of ye pleura, & from that into ye Mediastinum, It is generally imagined likewise, that ye water fills ye cavities which naturally contain ye fat, but that is mistaken, at least we can't as yet prove it, For many I found that ye cellular substance & adipose cells, or follicles are totally distinct that they have no communication. However Physicians in their practice have been led into this opinion, from ye circumstance of ye fat being generally consumed in Dropsical persons, & even in several Dropsical subjects where ye disease had continued for some time, I have found ye adipose follicles filled with their natural contents, nor could I discover any, wherein ye fatty cells are filled wt water, nor have I been able to find that ye place of ye fat comes to be supplied by ye water, tho that is often, in some cases, that is, if you make an opening into ye subcutaneous cellular substance, as far as it is yet known, you may discharge all ye water in such cases collected, so as

call

call this species Encephalocystis, or Anevrisma
or in plain words Bladder, & we may add
(diffused) you must know that y. water may
be confined in many shut Cysts found in y
body, for recollection, you readily determine
y. place of these, y. principal ones are but
few in number, There is a shut Cyst between
y. Dura mater, & arachnoid coat of y. Brain
y. same cavity is continued from y. Dura
mater between y. spinal marrow & ye
skull, so there is one Cyst over y. whole con-
face of y. Brain, & of y. Spinal marrow, so
y. water collected by a fault in y. head
may fall down into y. spinal marrow, &
form tumours at y. bottom of it, or y. disease
called Spina bifida may arise in this man-
ner, but in general absence of convulsion
ossifyd, whereby this communication is in-
terrupted, Sept. I have shown that all y.
Ventricles of y. Brain communicate w.t
each other, making one Cavity, but not w.t
y. first Cyst I have described, so there
may be two species of encysted Hydrocephalus
y. head, y. external & internal Hydroce-
phalus

phalus. Kept ye coats of ye Penis a type
containing naturally ye aqueous humour, wch
sometimes enlarges, so as to require an opera
tion. Then going lower into ye Thorax we
find ye Pericardium, & ye two Pleuræ, & in ye
Abdomen one great sack called Peritonæum
& we add to it ye sack afterwards formed
out of that one, which includes ye testicle, ye
Vaginal Coat, & in ye female ye ovarium is
full of Cysts, & there may be a dropsy in
every one of these natural ones, but besides
these Cysts, which are diseases by dissection
Diseases produces others, so that there may
be preternatural Cysts in every part of ye
body, as in ye Spermatic Cord, Kidney, under
ye skin &c, or we see that there is ye Disp.
sed Dropsy & ye encysted, which is diverse
into ye natural encysted & ye preternatu
ral, which are ye effects of Diseases.

Let us next review ye general
causes of Dropsy, why is it produced, we
would first say that there may be 3 Caus.
ses forming it. The first & most comm.
is ye hindring of ye absorbing vessels, which

which naturally convey watery humours, & as we find in Fevers, examples of y^e Thoracic (and having vessels & collections of Chyle made w^th in y^e Thorax, so y^e small branches may be subject to y^e same accident, that this may happen very rarely, & I know that incumbed Lymphatic refuse to heal very readily, I have known, in letting blood, Lymphatic veins opened, which discharged their liquor, for some time, & afterwards healed up, nay I have known y^e receptacle of y^e Chyle, that vessel transversely, unite again, & y^e communication come to be compleat, but we may hold this in view as a possible cause of dropsy. Next if we are to speak in general terms, y^e collection is either from an increase of exhalation, or that y^e inhalation is diminished, I shall let us reduce under general heads, y^e various causes which can induce either of these causes, & we shall find that they depend partly upon y^e fluids, partly on y^e solids & that very often both are in fault. Thus we find several Anomalous motions

altered

allowed where ye flow of ye urine has been
interrupted, & dropsy have succeeded, & in this
case we conceive that our mass of blood is
overloaded wt ye watery vehicle of ye food,
which gets thro ye cephalanto into ye cavities, & on dissection, have found ye Intes-
tines of ye vessels of ye Mesentery, filled wt
a velaceous matter, where ye pressure of
ye vessels must have prevented ye free re-
action of ye urine, Now if we can prove
that a Dropsy begins sometimes in that
manner, & an ye quantity of watery vehi-
cle passing by ye skin is in this Disease
nearly equal to what passes by ye kidneys
a want of due perspiration may in other
cases induce ye same complaint, Or take it in
another view, we have instances of Dropsy
following large Haemorrhagy, where some
of ye principal vessels were divided. In this
we may join an Opponent of Bowel, he
drains off ye blood in large quantity, & pours
them ye Animal freely wt ye thin watery
ye vessels came to be filled wt ye Aqueous
& swelling were produced. In others there
is

in a want of a sufficient quantity of the watery part of the blood to enlarge the diameter of the vessels, there comes to be an effusion of serum, may depend upon the state of the fluids, & many circumstances may be supposed to introduce such a state of the mass of blood. Dropsy can give very clear proof, that a relaxation of the solids may be a cause of Dropsy, because we find it succeeds the weakness of the solids however brought on. If a person is obstructed in any of the veins, it is a common thing become dropsical, while the state of the fluids remains unchanged in respect of the Body, we can account for this from the relaxation; And this is in proof that exhalation is not performed by inorganic force, but by a regular organization of the solids possessing the living & muscular power. Now if exhalation can be increased by a mechanical pressure in effect the veins more than the arteries If this a figure round my arm, so that the blood forces into the arteries, but its free return is prevented, the re-

swelling & even of whole arm. Lower parts also further, that of swelling suspends, that you can fine of pressure to y^e veins only, which not owing to y^e absorption being prevented, for this is performed by y^e lymphatic system, or y^e inhalation is not diminished, but y^e exhalation is increased, y^e blood returning w^t greater difficulty, y^e thinner parts are pushed off by y^e lateral exhaling vessels. In like manner we explain how a Scirrous liver does not always produce dropsy, from y^e matter being more or less dissolved in y^e circulation, & making y^e return of y^e blood more or less difficult, & we find that y^e disease produces a dropsy only in y^e recess, which in y^e course of circulation pass thro' it, or we do not find that a swelling of y^e liver occasions a dropsy in y^e lower extremities that is, it does not affect y^e alimentary passage by the belly, but y^e circulation increasing y^e exhalation. Now Scirrus every where will act in this manner, they affect y^e veins in y^e way allegatures does, assisted in imitation of y^e other

exterior

experiment. Some have rashly denied this effect of ye ligature, because on tying a single vein such swelling does not happen; but on account of ye free communication there is between ye veins, in order to get ye experiment to succeed we must take in ye whole of them. How an increase of expiration may occasion ye increase this may prove from a fault of ye blood, or from a fault of ye substance circulating that blood, or from mechanical pressure. I would include here even where ye Solumen of a Bowel has effect.

Let Empty Animals (as men &c) a want of ye proper inhalation. You perceive conceive this, if you reflect a moment on ye way ye inhalant System speaks to convey its fluids. They may enter by ye attraction of capillary tubes, but this does not seem to continue ye motion, but ye muscular power. If ye inhalant becomes necessarily may be weakened by a variety of causes in so in paralytic cases, whilst ye motive powers of more readily by ye exhalant, it may be taken in more slowly by ye inhalant,

Let

but if there is a mechanical obstacle to the return of the liquor there, the absorbents will happen very readily, & on this principle, we can come measure explain the swellings, & sometimes (O) also we meet with weakly persons to begin in, the act, & obstruction of a few lymphatics does not produce the swelling, on account of the many communications, but when we especially a large swelling in the limbs, from tumours of the lymphatic glands, & when cancerous matter has been carried in them the Brain, & conveyed into the lymphatic glands we have known the whole arm swelled, & yet it was not more diseased than the other in any other respect. Now neighbouring parts may swell, & prejudice the lymphatics in their course. So, in the Jaundice produced by a Schirrous liver, which does occasions a swelling of the Belly, but not of the lower extremities, when the water is accumulated to a certain degree in the peritonæum, & the absorbent vessels are prejudged against the bowels, & the liquor returns in them with difficulty, the swelling

inf

ing of y^e feet takes place, tho' there is no mech
nical communication between y^e cavity of y^e
joint-seam, & y^e cellular substance of y^e
foot. Now under these few general heads
it is possible to reduce y^e causes of Erysipe
las necessity of attending to them is evident
it shews that there is no general cure for
y^e disease, but y^t we must vary y^e medicam
according to y^e cause, whether relaxation
obstruction &c.

Yet I do not deny this in y^e same
breath you will generally find that y^e
effect of employing y^e Empirical Cycle, is
more attended to by Physicians than
removing y^e cause; & that they proceed by
general rules too much without making due
allowance, so in y^e first kind of
disease, y^e amputated, as in Ancles, when
y^e foot swells, we are not to imagine
that we have occasioned this by y^e posture
of y^e patient, but only y^t it is occasioned
by y^e cause of Ancles, & shews itself in
y^e feet, in consequence of y^e posture. It
is evident therefore that Surgeons are

in

n of wrong, when they are afraid to indulge
(patients in exercise, which is necessary to give
it, for the chance of recovering their tone
for tho' it does leave them ill at ease when the
patient is erect, yet by counteracting the cause
wrong exercise & freedom, & assisting
by mechanical support, the pressure of great
distension of the skin, at one particular
place, we may perhaps remove the disease.
Kept in all the Kingdom of Dropsy, & almost
without exception Physicians prescribe alcoholic
diet. Now tho' in many instances (during
may be very hurtful, & that in every one tone
of tumor increases if used slowly, yet where
it depends upon the evolution in the diseased
viscera, & swelling of these acknowledged
cially on the circulating System, that
rule is not to be adhered to, & nothing
this caused so common, we understand
how persons drinking largely of Mineral
waters, have been cured of Dropsy, the
water adding to the swelling, but taking
off the same time upon the tone, so
at the time, the swellings gradually

disappeared

(disappearance . .

There is a third circumstance, which they likewise generally run in, they endeavour to find out that kind of discharge, which shall y^t most speedily evacuate y^e Purulent matter, & promote (as this perhaps y^t most readily. Now, that we are often unnecessarily alarming ourselves by fancying we apprehend we would use them in y^e wrong place, for suppose that you have a patient of a Dropsical tumor by this cause, upon devioting from y^e cure y^t discase returns this not being a natural opening of y^e body, so we would open either y^e stomach or bladder, as Diaphoretic & Sudorific medicines ought to be more inviolably. But suppose not y^t every circumstance is to be attended to, not only y^t effect but y^e power of y^e disease; & that our medicines have failed, we are under y^e necessity of having recourse to a Surgical operation of letting off y^e water, we first proceed to show y^e manner of doing that, & we shall begin with y^e diffused

(Dropsy

dropsy, where y^e water is contained in the cellular substance. Generally Surgeons delay an operation, till y^e skin is so much distended as to be ready to burst, now I am perswaded that we will stand a better chance of curing y^e patient, if we make y^e puncture more early, because y^e whole parts of y^e body by y^e distension lose their tone. The operation itself is perfectly simple, some use a knife, & w^ch it make a large incision about y^e size of an Ace, I have seen them made 3 or 4 Inches in length. But it is not necessary for y^e operator to account for their practice, they seem without any reflexion to have transferred y^e operation for y^e cure of y^e hydrocele, without considering y^e total difference of y^e effect, as if we meant to cut upon y^e whole cellular substance of y^e body, but we are merely to let out y^e water, so y^e effect is y^e same), whether y^e incision be large or small, &, besides y^e pain, they are particularly dangerous as from y^e drawing of y^e water, y^e part inflames, & very readily mortifies, &

I have seen a great deal of trouble when a
y^e biggest kind of tarcel wanted, so that y^e
Surgeon was well pleased to be able to stanch
up y^e wound he had made, so we would proceed
w^th great caution in such cases, & if y^e dev-
ision is very considerable, we do not use
to make y^e Incision in y^e most dependant
part, that is in y^e foot or Ancle, but we first
perhaps begin in y^e thumb itself, or near
y^e top of y^e thigh, applying what is above
then going lower, as there is real danger
from y^e water all drilling thro one wound
& y^e Surgeon is apt to get much blame,
as y^e principal cause is but small. he
ought not to run such a hazard, especially
as no advantage attends such free opening
then if y^e first opening is too small
it is easy to make new ones. & y^e com-
mon tarcel makes an opening suffici-
ently large, we enter it under y^e
skin, & cut y^e cellular substance
freely round, otherwise it closes y^e
wound. Having thus made puncturs
we endeavour to direct y^e water to

y^e

y. punctures by proper pressure & friction
of y. body, & this also assists in making
y. skin recover its tone, & serves to enable
y. absorbent vessels to do their office of
taking in y. fluid more freely, & w.t y.
same view we support y. skin w.t proper
Bandages, & instead of linnen, we use
rollers of flannel, which by their elasticity
support y. parts, & take in more of y. move-
ment, so that y. skin is not nearly so
much galled, & chafed y. water removed
immediately from y.e punctures, you defend
y. skin by some greasy substance, & y.
same time after y. first tension
is taken off, we give y. medicines as w.e
we place our confidence, but along w.t
these, in y.e case of Anasarca, we give
Vomits frequently, which give a general
stimulus to y. parts, & enable them to
recover their tone, & mechanically push
y. water from y. cellular substance
of y. Bowels, in which it is apt to stag-
nate, & we ought likewise not to con-
fine y. bandages to y. extremities but

over

due to take in ye Tunica, a considerable quantity
of water being lodged so deep that we can't
distinguish ye swelling by ye Scal. Dolor
next supposed that ye water is contained in
that sacco, & shall begin wth ye water
natural that cyclo, as there are seen ye
most part small, & ye most cavitymana-
ged, in this case ye very name operation
is nearly necessary, as in ye hydrocele
& a velan passed thro xb is particularly
proper, I would prefer it here, there I pre-
ferred ye Incision in ye case of hydrocele
because ye said can have no bad effect, by
adding on ye Scalick & swelling it, as in
ye Hydrocele of ye Spermatic cord ye velan
is preferable to ye Incision, provided
only we can discover ye situation &
ye larger vessels, wth out making such
an opening as is necessary to bring them
in view. Hospes that ye said Rocca
vian abandoned ye use of Butterhose
that is not practicable, & ye Lumaca
is large, we endeavour to palliate
ye complaint by making a pressure

but

but whereas that is not practicable we shall seldom make above by three or by medicine
it being particularly difficult to cure watery
natural encysted dropsy for the y. reason
may form some opinion yt intestines
and probably not formed in y. same proportion,
so y. chance of cure is less than where y.
water is confined in y. natural cysts.

Supt supposed that y. water is confined
in y. natural Cysts, as take y. water in
y. Peritonæum, or Ascites, where y. belly
swells like a bladder filled w.t water.
Now, first it is very material that you
determine not only y. presence of y. water
but y. exact place of it, we know water
by y. swelling & fluctuation w.t y. want
of circumstances to produce an abscess
y. manner of feeling is this, you lay a
hand on one side, & strike w.t y. other
either w.t a single finger or w.t two together
you can make y. water undulate so
yt if you had used to feel you know it
certainly, at y. same time I have sup-
posed persons who were supposed to
have

me'n dropsy, & when m'. ul touching them
knew there was a fluctuation; Where fat is
collected, there is somewhat of y'. general ap-
pearance, but y'. Umbilicus in drawn inwards
whereas if water is collected, it is protruded
wards. If y'. quantity is small y'. Surgeon
places y'. patient in a sitting posture, &
bending forwards, so as to press y'. bow-
wards, when he feels it, but if there
a great distension, & y'. skin does not
yield sufficiently, he will feel it bellow when
y'. patient is laid on his back. m'. y'. shoulders
raised, & y'. pelvis relaxed when y'. water
is moved w'. greater freedom. Last we
distinguish y'. water in y'. ejen cavity
from y'. collections in particular cases
by attending to y'. posture, if y'. tumor rises
above or below. & extends gradually, this
in. Besides y'. water allows no situation
according to y'. posture of y'. body, so we
distinguish it from a dropsy of y'. ovari-
um &c. But there is one kind of dropsy
where there is more difficulty, & very
great danger if y'. water is contained
in

in y^e great vaste, to which y^e Ignorance of
Monkey leads. Suppose it to begin in y^e Liver
which is obstinate perhaps & that an ann^l in-
flam^n coming on shuts y^e passage, if y^e
Surgeon performs y^e operation, he may wound
y^e stomach, or Colon before he gets to y^e matter
who should have y^e possibility of their
knowing, if ever it lay y^e exact posture y^e water
falls to y^e bottom of y^e Belly.

Tho' suppose that there is no doubt
w^t regard to y^e nature of y^e disease, & y^t
we are aware y^e necessity of making y^e
perforation, or suppose that y^e patient
is convinced, that he has a better chance
of being cured by submitting to y^e operation
early than by delaying it long, which
is a general rule in dropsy, but particu-
larly in Ascites, where y^e urine runs in
danger of not being secreted so readily by
y^e pressure of y^e Ascites against y^e bowels
bowels. The antients performed this opera-
tion under many disadvantages, as
they wanted y^e proper Instruments, in-
stead of y^e Trocar they used a double
edged

edged knife, then thrust in a pipe, which
did not well fill ye hole, nor did they allow
to ye proper posture of ye body, & they wanted
means for making pressure in ye operation.
Now we first employ ye Trocar, an Instru-
ment which fills ye hole we make, & ye
we can stop ye discharge at pleasure if
any have that be necessary. Next we attend
to ye posture. Mr Sharpe to this day directs
that ye patient shall be placed in ye sitting
posture, wherein he certainly ought to be
laid horizontally. We all know that in
common cases of faintness, ye horizontal
posture recovers persons, & it is scarce
ever necessary to attend to this in tapping
even taking off ye pressure from ye lower
part, ye blood rushes in there, & a smaller
quantity goes to ye head. Besides there
is not a single advantage attends it, for
if ye operation is done in a sitting pos-
ture, all below ye part, where ye Ins-
trument is entered remains full of
water, whereas if ye orifice is made at
ye side, in ye horizontal posture, it

can

can be made at ye lowest part of ye Belly, & we can draw off every drop of ye water. The last advantage was first pointed out by Dr Money, & more particularly by Mead ye making a pressure in time of ye operation It is generally directed to be done by means of a roller of flannel, which at first may answer tolerably well, but we need to study it, so it is more convenient to have a belt like one which was proposed by my Father in ye Medical Essays, it is made of flannel to lie next ye skin, but elastic cane is joined to it, by which it does not yield so readily. It is put on before ye operation, & there is a sufficient opening where ye orifice is intended, we draw it w.th Buckles, & to prevent it from slipping, a strap goes round each thigh. Now instead of that I have caused to be made a more convenient Bandage, a flatt waistcoat, w.th gives 2 Buckles & a strap round ye thigh. There is an opening in ye side, or without altering this circumstance, we may turn

turn back y. Waistcoat till y. water is all discharged. For y. operation we ought to be provided w.th Trocars of different sizes for common use one of that size I shou you will answer very well, but sometimes y. water grows glutinous, may we have a few examples, where Hydatides were found in this family, & an Incision was necessary to let them out; The patient is laid upon y. very edge of y. Bed, w.th y. side over y. edge of it, & you put a round pièce of Flannel, y. ends of w.ch may be taken up in a bit of wood but y. wood must not be very long, otherwise at y. end of y. operation, it presses against y. parts, so you take a short bit, such as you can easily twist. Next you determine y. place of y. puncture, which ought to be halfway, between y. anterior spinal process of y. Os Ilium & y. umbilicum, where y. Bowels are not immediately applied to y. Peritonæum, but where y. water has got between y. fore part & y. Bowels. Generally we pass y. last side, because y.

y.

y^e liver is most frequently discovered, but y^e
ylcer may fall down by its weight; & we
ought to examine this as well as we can.
That y^e Trocar may enter readily, it is proper
first to make an Incision in y^e skin w^th a
Lancet, & making a regular allowance for
y^e thickness of y^e teguments, which are much
thinner in Dropsy. The Surgeon puts his
finger on y^e Trocar, that it may go no deeper,
& enters y^e Trocar like a Quill, till
he finds y^e want of resistance; then taking
hold of y^e Canula w^th one hand, he w^th draws
y^e perforater w^th y^e other, & putting y^e patient
in y^e proper posture, he keeps up y^e pressure
wch y^e whole time y^e water is running
out. This is of y^e utmost consequence
as otherwise mortification or Gangrene
may be brought on from y^e skin shutting
& y^e blood stagnating in y^e lungs in con-
sequence of y^e lax state of y^e abdominal
muscles. I had occasion to see y^e effects
pressure to a remarkable degree; where
no English pint of water was drawn
off in 24 hours. By y^e time y^e water
was

was half drawn off, ye patient herself discer
ned ye effect of ye injection, & ingenuously
faint called out to pull ye tube, & lay assis-
tying; ye injection immediately, she was not
more faint at ye one than at ye beginning
but a little was made at every time to
begin her a little time, which is always
proper, ye turn of ye Gut & ye little ye
of ye water, we put in a probe, but it must
be handed, least it fall into ye cavity of ye
Abdomen, & if in any case ye patient grows
too faint that it might appear unsafe to
draw off ye whole at once, there is no occasion
to entertain ye notion of ye water putrifying
for we wait a day or two, shave twenty
ye one half drawn off with relief, & ye other
half not drawn off till 18 or 20 days after
After it is all taken away we withdraw ye
canula, & put on a patch, & in introducing
ye trocar, we may slip it beneath ye skin
a little way, & then slip it in, which pre-
vents an oozing, ye might excoriate ye
parts

In ye diseases generally plumms vul-

plancks

stances have been thrown in to heat y^e mouths
of y^e vessels, & one or two lucky cases have occur-
red, where a compleat cure was obtained
in this way. One of y^e patients was visited
with some perforation, i.e. an Inflammation
of y^e Bowels, I suppose from mismanagement
in y^e operation. In the Philosophical Tran-
sactions you will find some such attempts w^th
inhaling & astringent liquors, in one they
they produced a cure, in others they were y^e
cause of death, as they did not lay y^e epi-
ment first on quadrupeds, they used Sa-
water &c & buying, y^e same experiment on
a sound Dog, he died in y^e same time
& shews that several substances which
can be introduced into y^e stomach & intes-
tines have any fatal effects, till quantity
when poured into y^e peritonæum. Thus opium
have much greater effect, when poured
into y^e peritonæum, than when taken
into y^e stomach. But supposed not that
these fail, some have proposed to introduce
a vein, & Dr Young told me, that he
have seen this tried, but that they were

ob[illegible]

obliged to withdraw it, I might have added, in speaking of ye Injection, that perhaps we might inject [illegible] which might occasion an Inflam: sufficient to bring on an adhesion of part to part in Injection we can often not discover ye smallest Discave in any of ye Bowels, nothing but a general state of relaxation. But supposing ye valve necessary, you introduce it with Houlters Trocar, you enter it into ye cavity of ye Abdomen, till you feel a want of resistance then draw back ye perforater, till you bring ye Canula to ye proper distance, when you bring out ye trocar, then withdrawing ye perforater, & entering ye valve, ye water runs along, there is one other circumstance on which ye operation should be done, in consequence of wch effused, I told you ye origine of this, ye manner of doing ye operation is evident wch is saying any thing of drops in ye thorax at present. With respect to ye head I have only to observe that in some few instances an eternal Hydrocephalus has been in a shut sack, particularly in Children at Guilt, & if these continue long

2

a Cord may be passed thro' them, but for y. most 218
part they gradually disappear. The water besides
may be collected both w.t out & w.t in y. brain
but in 99 cases of 100 it is in within; & there
is a dilatation of the head, even where y. water
is w.t in, oftener than Dr. Whyte is aware of,
who in other respects has wrote better on
that Complaint than any other person. But
where there is any probability of its being on
y. outside, we may cut y. skin, then scratch
y. Dura mater at y. side of y. Bregma, where
y. bones are most open; & if there is no
water we would stop, but if there is any
we would let it out, making y. proper Com.
profsion ~

Sect: 105

. Correspondent properly observes, that when we
attempt to reduce a Hernia by raising & agita-
ting y. body, attention should be paid to y.
state of the respiration, i.e. y. patient is not
to resist by inspiring, but to slacken y.
Abdomen.

When speaking of looking for water
w.t in y. head, I thought it unnecessary
to

to mention any reason to dissuade you from letting out the water from the Ventricles of the brain which must prove fatal in consequence if the wound touch the medullary part of the brain. Say if you could suppose it in the power of the Surgeon by a wish to remove the water, the parts of the Brain falling together, would unquestionably produce fatal symptoms. supposing the quantity collected to be considerable, such as by the dilatation we could discover?

We now proceed to the Paracentesis of the Thorax, which requires to be considered apart, as we want the evident fluctuation of fluids to discover the presence of the discased, & in consequence of the difference of structure; the method of operating requires to be varied. It may be necessary to perforate the Thorax in consequence of air effused of water, effusion of blood, you recollect what proved with regard to the manner of respiration; that the lungs with respect to their dilatation are merely passive, that they are fixed contiguous to the containing parts

parts, & follow their motions only by means of
air by its weight acts against their inner side
having, no other relief but y. Trachea arteria
This being understood you have y. danger
which must attend opening made into y.
containing parts in a sound Animal, that
if such be done, y. air comes to be applied
to y. outer as well as to y. inner side, as
y. y. lungs remain nearly immoveable
supposing y. operation done on both sides at
y. same time, If y. operation be done on one side
a large opening made, y. lung of that side re-
ceives the motion in a great measure from
y. other side, i.e. The Animal by an involun-
tary nature, when about to inspire contracts it
self, that while y. sound lung is performing
respiration, y. side w.t y. opening is per-
forming inspiration, or rather is violently
kept in continued, therefore in that imperfect
manner, If however y. opening be very small
y. air whilst y. Animal makes an attempt
to inspire raises y. containing parts
suddenly, entering however in smaller
quantity by y. narrow wound than by y.
Trachea

Practica, there may be even unperfect cure of ye
fistula, so there is a longer adherence even small
wounds made in a warm humid. Therefore
I shew that Surgeons in cure of wounds for
sake of dispatch, or make a wound w^t
any manner following. The fault is of those
are not more offended by ye air let in them
they are by ye matter longer detained here
we must add that whilst ye matter which
was collected gave a discharge, for ye most
partial adhesions suppurat then mechanic-
ally, so that they are dragged along w^t ye
continuing parts, or by ye adhesions they
are prevented from collapsing.

And let us also by ye different seasons
places that may render ye cure necessary
to begin w^t an issue. Summary by perspir-
from ye lower their membrane removing ye
lungs, even w^t ye continuation of ye fluxes
adds to it may from a violent cough hurt
may you would rather wonder that there
does not happen oftener. The chief reason
why it is so seldom is, that ye membran
of ye lungs, but their sweats, is not tasted

are

a little dull elastic sac as can make y. lungs
swell beyond y. containing parts. The Membrane
of y. lungs is therefore supported by y. contai-
ning parts, just as a thin bladder covered
w.t leather receives additional strength from
y. leather, so that it is not in our power by
a blow to make it burst. But nevertheless
does happen, an Instance of which I have
when I was at Berlin w.t Dr. Hutton in
1757 On opening y. Abdomen paralysed
we were surprised that y. Diaphragm was
convex towards y.e Abdomen, we suppose
y.t water had been accumulated w.in y. thorax
but on cutting y. Diaphragm there was a
vast blast of wind, & examining farther y.
lungs of that side when we discovered y.
contrary, were squeezed into a small bulk
at y. top of y. Thorax, & there lied down, no
hole could be observed, nor did air escape
from y. Trachea arteria when blown in.
as y. lungs had burst. Mr Hale was persuad-
ed by this case, supposed mucus to have
gathered in y. Trachea, was in some
measure to have obstructed y. passage

4

That y air in y lungs, heated by y body occasioned y rupture, but it is more probable that it was occasioned by some violent effort, & y passage being obliged, it might not be able to return, so that gradually more had been accumulated, till y air was condensed so as to squeeze y lungs together, & then an Inflammation was excited, which probably hardened y original hole.

Sept we may conceive that when the membrane of y lungs gives way, y pleura lining y ribs shall likewise give way, as this I have not in two examples.

A Man of 55 years of age, not subject to any chronic complaints, farther than that he had a cough in y morning, as many at his time of life have, during this cough he was struck with a violent pain in y space of a few hours, he observed his side to swell, the swelling extended over y thorax, & face, so that touching y skin there was heard a crackling like that of a dried Bladder filled with air. I am mentioning this case to Mr Hamilton

D

it put him in mind of another case of a Girl
in Child Bed lying to stifle her cries lest she
should be discovered, observed a swelling upon
another Body, which colapsed & considerably
way, w^th expiration & inspiration, but it went
off after, & how suppose next that a rib
is broke, & y^e end heart inwards, you conceive
that y^e lungs may be wounded, & y^e air getting
out may be confined w^thin y^e pleura getting
out thro' y^e oblique wound of y^e lungs, while
y^e Pleura is prefsed against y^e intercostal
muscles, which acts as a Valve, But
generally if y^e wound of y^e pleura is considerable
y^e air will spread from y^e cavity of y^e Thorax
into y^e common Cellular substance, &
get out between y^e fibres of y^e intercostal
muscles under y^e skin, & be diffused uni-
versally. There is one other probable me-
thod in which an effusion of air may hap-
pen. The lungs may be corroded by an
abscefs, & y^e membranous destroyed, pleura
&all, so that y^e matter gets between &
y^e air will escape w^t y^e matter &
get into y^e subcutaneous Cellular sub-
stance

stance, as if ye adhesion be complete, ye matter
yt may occasion ye death of ye Person
& in fact in some cases where matter was
collected in ye Cavities of ye Thorax, it was
found mixed with air. There were bubbles
air found out w.th ye matter, as soon as
ye incision was made. We might from
these observations as that ye Pleura was
drawn off ye Lungs, yt was by an effort
in ye Intercostal of ye Cheast & yt was
occasioned into ye intermediate cellular substance
which lies in pleura to ye Lungs, &
soon to ye skin, but in ye adult those
parts are so closely connected that there
will not readily happen.

It remains only that we should
remove these Complaints, & sometimes ye several respective causes of
Symptoms were in a great measure
pointed out. As soon after meeting
with some accident as wounded with any
sudden oppression, where there is no
room to imagine that pus is collected
or blood effused, as there is not that
patient

patience which attends Hæmorrhagy, & where it is known upon from y^e Trachea arteria, we are led to conclude y^e oppression to arise contained between y^e lungs & y^e pleura, & this may be so condemned, as the pressure then more than if a wound were made in y^e side they were expressed to y^e Atmosphere. There may be an actual condensation y^e patient feeling a difficulty in respiration, upon violent exertion of nature y^e Globules is more contracted than in health, & pressing out y^e air w^t violence, it passes thro' y^e oblique wound, & can't return, so it is condensed to a great degree.

But in such cases, we may relieve or cure y^e Patient by y^e Paracentesis, & certainly there is great room for proposing such an operation. Where y^e lungs & pleura have together, 'tis saved it to be done, & w^t great advantage, where upon y^e history of y^e case y^e patient was exceedingly oppressed, not able to lie horizontally, but was panting for breath & fell y^e greatest degree of uneasiness

at

& y. came time y. place was flushed & y. pulse small & quick I made him (except y. place) where he was dressed w.th y. men, it was on y. night we stood about y. middle, & y. second d. Surgeon made an incision at that very place, as d. air had got out into y. cellulous & cellular substance I thought y. person might be relieved by that means & y. farther effusion of y. air prevented. This however proved insufficient, we had recourse to the 2d y. opening & it did not take effect from y. time he had not caused expectoration he was ordered w.th a Tincture which was introduced into y. cellular substance under y. skin & then y. point turned inwards & was fixed like a drill till from y. want of room hence we found that it had entered, & then w.t drawing y. pipe out of y. Canula, & there was such a discharge of air that we lighted a candle & it burnt as much as if put out by it & it was observed as remain condensed in a large measure. It then drew off y. matter

motion inwards & outwards accompanying* respiration & ye violent pain that ye air caused from blowing ye patient found relief by both in lie, and hast ye lucy in any position, & ye pulse felt remarkably, tho we were not provided w^t any other Instrument, we left ye Canula of ye Trocar in a standing way, & confined it w^t a Bandage. Sept 9 afternoon I found on visit that he could breathe w^t ease, & that no accumulation was made, that ye pain in ye Thorax, was altogether abolished, ye hole had shut up, ye Inflammation had ceased & we that now ye Canula was w^t drawn, & ye patient was restored to his former state of health, but about 12 months afterwards he was seized w^t ye common Symptoms of an Inflammation of ye Lungs, & died of a suppuration w^t in them. Now in ye whole I am clear in such a case there may be almost relief from ye operation I have mentioned, & that cases requiring ye operation, to secure very frequently but ye cause have not been understood nor properly attended to, such cases

especially

especially following fractures, when have happened often, & if patient have lost his life from ye Surgeon being ignorant of ye true cause, & ye manner of curing it. Next ye Trocar is ye proper Instrument, & we are not to limite ye Incision, for tho we enlarge it ye more ye small Trocar, ye patient will not suffer any material injury, & we take one that have a blunt point, & enter it into ye brain, but slightly into ye Membrane lining ye skull, we may enter it without wounding ye Dura mater unless we are very wrong in our Conjecture. If air rush out upon ye Dura mater, but suppose we do not find air come out, that is not a material injury wherein ye incision is very long, nor producing violent Instant. from ye air getting freely in, If we mean to have a tube in, we prefer to ye Cannula ye Trocar a hollow Catheter, or hollow Forceps, May with such an Instrument we can do somewhat more, a person can apply his mouth, or a Syringe to ye tube, & suck every particle of ye air out

ml of y. Thorax.

I shall next put y. case of water being collected, & tell us how and are to distinguish y. water which is supposed in case of Anasarca from that of a high degree of probability. The general marks are well enough laid down by Accurate writers, as by Dr. Cullen in his Nosology, what I have seen are these, The patient is of a Dropsical habit, or some considerable time preceded that often induces this, where there has been a slight degree of Inflam.n & that seems to be discussed, after a disposition to Dropsy succeeds, as in y. Scarlatina which occurred last year, a Dropsical disposition showed itself after that disease, or where there were complaints of pain about y. Thorax, which were not followed by marks of suspiration, in some time afterwards a Dropsy has formed w.h in it, or this disease will come on w.h out y. patient being sensible of any cause, y. urine is often but not always scanty, for in this small cavity, y. decrease in y. urine is less remarkable

than

than in Scotland, but still it may be observed to be scanty, & high coloured. Next ye patient feels an oppression about ye breast; hence difficulty in Breathing, particularly in attempting to walk up hill, he has a cough but without spitting from ye Thorax, it is ticklish & dry, his feet are apt to sweal at night. After ye disease has made some progress, ye sleep is much disturbed, ye weight of ye water preying upon organs necessary to life, affecting ye regularity of ye heart, as well as of ye lungs, so he awakes frequently has disturbed Dreams, & we (distinguish that ye water is not w^th^in ye Pericardium which produces all ye symptoms I have mentioned, by our feeling ye pulse of ye heart, whereas when ye water is w^th^in ye pericardium, ye heart is buried in it. Then we ought to attend to ye posture of ye patient, that he is much easier in ye erect posture, & on lying down he falls an oppression, for when he is erect ye water pushes down ye Diaphragm, where as when lying ye Thorax is straitened

but

by ye weight of ye Abdominal Bowels, but there are some farther Circumstances, one which I have not been sensible of, but I have no doubt of it, i.e. ye Percussion I mean it does not sound like a Drum containing air, Lastly ye undulation of ye water may be perceived in several Cases, I have observed that where water is collected, it does not always float freely, but there is surrounding ye Bag, an universal adhesion but if ye disease comes on slowly w.t out Inflamma.n to produce a coagulation in part by ye gliding of ye water can be felt & heard.

Now suppose from all these circumstances concurring, that we are certain of ye presence of ye water, should we not attempt to relieve ye patient by an operation? It has been done sometimes because till of late years, ye nature of water were not clearly known. Most of ye disease often proves fatal, & ye matter exhaled in ye thorax is looked upon with dread, Surgeons did not attempt any operation

operation but they should be blamed for ye after death of ye patient, but there is no doubt but ye operation would be more successful here in many cases than in ye Abdomen, there are other causes ye disease is incurable, as when ye cause of ye collection is rooted in ye diseased lungs, a schirrous or hard state of them producing it, as ye hard state of ye liver produces it in ye Abdomen, or in other cases I have observed ye water to ossify in ye mouth of ye aorta, for as an obstruction in ye smaller circulation frequently produces dropsy in ye cellular system so a general obstruction in ye cellular system, will occasion dropsy in ye Pulmonary, & in such cases there is very little hopes of a cure, but it is just as possible to cure a patient of a dropsy of ye stomach as of ye Vaginal coat of ye Testicle. it may depend upon an unknown disease in ye extremities of minute vessels, & may obtain a cure by producing an adhesion between ye lungs & sternum, & yet respiration may be carried on tolerably

rably well; may we generally find a puncture often a total evacuation of y. lungs to y. pleura would not only obtain a palliative cure, but we may make a radical cure of this disease we may occasion a conculsion of parts, by y. Inflam.n without killing y. Animal, we would try to determine y. proper method of doing y. operation.

I would lay aside Incisions, which have been proposed in all cases, & would begin w.th y. Trocar; & I would just try y effect of letting off y. water, when y. access of y. air may occasion such an irritation of y. pleura, as to bring on y. necessary degree of Inflam.n. We would do y. operation early, before y. lungs are contracted by y. water, which in time presses them to y. loss of y. Thorax. when they contract adhesions. But supposed that y. water collected again, we would think of an incision or rather I would propose a better method y. Introducing a Seton, I would take a bended Instrument, & instead of ^ of y. Circular shape, shall be entire between y.

(illus.)

Next I shall suppose a suppuration in y^e thorax, how are we to distinguish (that is y^e) y^e (difficulty) I might refer to y^e most common Modes for knowing when matter is formed. That a previous Inflammation succeeded by symptoms of suppuration, y^e patient feels an oppression of y^e lungs, has some degree of fever, has clammy cold qualities sweats, shivering &c^a & a difficulty in lying in a particular posture. By these we distinguish y^e suppuration, but we cannot learn where y^e matter is seated but often we judge by y^e seat of y^e pain, y^e manner in which y^e patient lies, what ordinary sleeps cannot only discover side, for when y^e patient lies on y^e sound side, y^e weight of y^e body excites y^e motion of that side, & y^e weight of y^e diseased side also excites it by pressure on y^e Mediastinum, whereas if you lay y^e patient on y^e diseased side, you no doubt straiten that side still more, but you leave y^e other free. So that by many

turns

tainio use of more easily. Next it is necessary to know whether y. matter is w.in y. lungs or w.out, if water is in y. chest, we know that it is w.out y. lungs, but in y. case of matter it may be w.in y. substance of y. lungs, & not in y. cavity of y. pleura. To judge of this, we enquire if y. patient throws up matter; if he does we know that y. matter is w.in y. lungs but that he does not, it still may be within y. lungs. We next discuss y. surface of y. side; y. tegumento, for tho' y.ey discase han not affected them, yt when y. matter is near to y. surface, y. tegumento are often thickened. We would next have recourse to y. stroke on y. side, & last of all to y. fluctuation, y. feeling y. undulation of y. matter; & hearing y. noise, it makes the possibility of distinguishing both, Viscera in Abscess, & it was no certain yt. it, that I caused y. side to be opened, In one case 11 pounds of matter was evacuated, in y. 2d. two pounds, & in y. 3d. 6 pounds, & y. two last patients were Brothers. Now let us be on our guard, not to

fall

fall into a mistake here, when the patient turns
y. Body quickly, or turns other ways, or when
a person is placed behind him on a low Chair
& takes hold of y. shoulders, & makes the
motion, y. noise of y. matter can be distin-
guished; as we hear y. dashing of water
in a Bottle half full. But some years ago
I had a clear proof that we cannot trust alto-
gether to y. noise. When I was upon this
subject, a young Gentleman attending Lec-
tures took y. fancy he had a Dropsy, & was
dying, & wrote so much to his friends, I
was called & was surprised to find a stout
well coloured Fellow dying of a Dropsy
but he told me that y. thing was beyond
a doubt, for not merely a motion was felt
but it could be heard, and I heard it
most distinctly, by making a particu-
lar motion there was a very loud noise
but I found that before he had drunk
pretty freely of water, may he had done
so on purpose, for his idea was that
y. stomach needed to be distended before
it could press against y. water in y.
pleura

pleura. Now here is a clear proof that by much
a motion of ye liquor in ones stomach may
be felt, so we should feel if ye liquor shifted
ye Thorax, that is dashed against ye part of
ye side, & we should mark ye middle place
w^t Ink. Now suppose that we have discov-
red ye Complaint, & even where ye matter is
within ye lungs themselves, if it appears in
ye form of an abscess, & we have symptoms
of suppuration, that ye patient discharges per
haps from 4 to 20 Ounces & more of matter
I would be inclined to try some opening lower
in ye Thorax. For every Abscess heals diffi-
cultly if ye opening is at ye top. So if
there is a fixed pain, & perhaps a swelling
of ye Integuments, ye patient will have a
much better chance by making an incision
there in ye common way. Suppose ye opera-
tion determined to be done, ye place is point-
ed out from ye undulation, but if ye motion
is general, & it is left to ye choice of ye
Surgeon, he makes it halfway between
ye top & bottom, as also between ye
fore & back parts, for if we go low, ye

Diaphragm

(Diaphragm may come in the way, it being near to the side) & it may have contracted adhesions. Then having determined the future method of the exact posture, we lay of[f] sufficient horizontality, whereby we is safe in danger of fainting, & we can make of[f] orifice of lowermost part. As to the operation it is so simple, that it is hardly necessary to show it, in case of this consequence, we are not to mind of[f] division of a few muscles, which are said to come in our way, as the latissimus dorsi we are to make the incision which is of[f] most favourable for of[f] purpose before of[f]. We cut partially to wit, & we donot make one Incision summoning of[f] external muscles, & another summoning of[f] Internal, We use a common scalpel, and make of[f] incision farther from of[f] ossa pubis than the understood account of of[f] danger for of[f] vessels & nerves, and in order to give the matter a free discharge, I make of[f] external incision large and free, then proceed by

by two incisions (dividing the integument) made
till I have laid the pleura in view. Then
I have ready a small Lancet pierc'd
(scratch) a hole in the pleura with my
knife, making it exceedingly small.
Then introduce an Instrument for dilat-
ing it, & use the knife with the blunt
point, & make a hole big enough for
discharge of matter. Now this is the
common method, but I am very doubtful
whether we had not better use a (and c.)
knowing in common abscesses, where
the vitæ is very considerable, and the
irritation may be too violent from the
incision, which perhaps helps in the air
too freely. But whether we use the
one method or the other, we may be
under the necessity of laying to prevent
all the matter from getting out at once
as the lungs come to be too loose, as
we take it off gradually, but we
need not close so often as have been
directed, for in the cases where it
is found came off every day it

it was discharged in two minutes, & the
patients were greatly relieved, yt. matter
having opportunity then more than once
or twice to gain. The dressing in the plaimost wound
and we are not to think of a Cannula, there being
no necessity for using any thing to keep ye.
wound open. The best dressing is to lay
a piece of Cloth as broad as ye. wound over
it, and on' ye. outside of it lint, which you
press against' ye. side of the wound, then
you apply ye. common Bandage. ,

Where Blood gets into ye cavity of
ye. Thorax from a wound, M.r Sharp advises
you not to middle with it at all, for says
he we are not to make an incision in the
time the blood is running, because if after wards
more blood, there is no better way to get
it than by pressing the nose & letting
it fall, and next the air must be discharged, the air will not suffer
it to gain. Now we are by no means
to follow Sharps here, for if a person re-
ceives a wound in ye. lungs, I would
allege that ye. wounded perfon, will

more

more quickly clear of the air get in than more freely, than if we shoot it out, so that it will not alter y^e case much, whether we make an incision in y^e side or not. If therefore from evident symptoms, as y^e paleness of y^e patient, the oppression of his breathing, and the weakness of the pulse there appeared to be a good deal of blood pouring out, I would be very much tempted to dilate y^e external wound so that the blood may get out from the thorax as fast as it comes from y^e lungs as it will be impos^d w^t certain success in admission of air, it will readily clot w^t in the cavity, so that it is in vain to throw in injections to dissolve it, nor can there prove that a great quantity wch good two pounds, can be absorbed w^t any degree of safety, as mixed w^t y^e air from the wound of the lungs it would putrify, corrupt & destroy y^e life.

Sept^r 5^th a surgeon is called, where there has been a collection of blood w^t in y^e pleura, is he to think that the na-

nature

nature, & many not all matter & matter
an incision in y^e. side & let it out.

Sect: 104

I proceed to explain the management of the kinds of tumours which admit of cure by operation; viz. Abscesses Hydatides &c. tumours which have been named by Authors Atheromata, Meliceridæ, Calyx, &c. y^e. treatment of Ateatom, Steatoma, and y^e. degenerating into Cancer &c. I come begin w^t. the kinds of Tumours that are y^e. most manageable, & where y^e. method of cure is determined & y^e. operation easy.

Let us first then determine y^e. way in which a common abscess ought to be treated, for Authors disagree very much about that. — It is a common practice in France to cut off a large portion of y^e. Integuments, on y^e. supposition that they lie loose after the matter gets out, confine y^e. matter and produce dangerous consequences. Others propose that a brein of caustic, nearly equal to

to the length of ye tumour should we open it
while others violent of the Caustick, cut the
abscess open from end to end, & minister
to nature as shee shall without all
openings, which they prevent by means
of a Cord or Seton. Now when the matter
is collected is made, & that we clearly
perceive a Fluctuation taint, let the Surgeon
be cautious how he attempts an operation
for he incurs blame without ye prospect
of doing much service. If ye tumour be
small, that there is an evident fluctua-
tion, he leaves the cure to nature, or he
applies a common suppurating poultice
to ye most depending part. But if ye
abscess is apt to spread under ye
Integuments, the danger being in pro-
portion to ye Cavity, as soon as the
Fluctuation is evident, he ought to let
ye matter out, or it leads to the general
peril wt regard to ye surgical treat-
ment of an abscess, and Damnation
fies from comparing ye different me-
thods, that the nearer we imitate ye
methods

method of nature, so much y. better. The cutting out large portions of y. skin is unnecessary & the making large incisions, admits of air too freely, which proves hurtful & great degree of inflammation & suppuration succeeds whereby y. constitution receives a violent shock, wch y. best method is to avoid. We introduce a Cord giving a convenient discharge by introducing y. one end of it at y. very bottom, & the other as y. situation of y. tumour will allow. In passing it we use y. crooked Trocar of Physicians, not having the perforator of y. flat lancet shape or if we want such an Instrument, y. place of it can be very easily supplied w.t a common probe Lancet. It will answer well to make y. opening at y. top first, that y. matter may not run out till I have passed my Cord, & then enlarge probe thro y. abscess, till turning y. point of it to obviate y. skin below, when I cut upon y. point of it & bring thro y. Cord. We draw y. Cord every day, changing y. abscess, y. [illegible] so

to prevent the matter from lodging in
tibia, & forming thereto, & to apply the
to recover its tone. If we suppose that the
matter is too much confined, we either
enlarge the opening, or cut upon the bone as
far as is necessary. Next suppose in
the abscess Hydatides, or that a bag is filled
with them; the method of cure differs in no
other shape, but that a large opening is
necessary, & we cannot attempt the cure
by a potion. As to the nature of these Hy-
datides, I am at a loss to determine: they
are not changed Lymphatic vessels as
I have conjectured, nor are they parts of
the cellular membrane joined to the rest of
the body, for there is no connexion by means
of vessels, neither do we find blood vessels
running upon them, you know that the
Hydatides at least such as are taken
from the liver, are supposed to be worms
I have examined these & shown you, which
were discharged from an abscess of
the loins, the very moment they came out
but I could not discover any thing of
life

up in them, there was not y. smallest appearance of motion nor by knowing & tearing them could any Contraction be seen, but they are different from many of the other Hydatides, they want a double tunic of skin, & a number of Vesicles upon y. inner (viz. which I take to be a tunic of Chamois) there were no smaller ones within tunic but a number of different vesicles floating in y. same cavity, so as that part, that y. smaller are bound within y. larger, I have not seen an absolute proof of it, how whether can we imagine that y. Cellular substance becomes divided & a number of Cysts containing water form in it, as in y. preternatural in cysted hydrocele, & that in consequence a suppuration y. Bags are loosened? leave y. nature of them to be enquired into by future observation, but as to y. method of Cure we give them a free discharge, & from y. Case I have mentioned it would appear that a bag formed by them is more disposed to heal up than

from common Membranes.

That ye next cause of Hernia or Rupture, is ye Palpa, which is much a humour in ye head. The treatment of these may appear in speaking of ye Spermatic encysted Tumors. We either remove ye Cyst altogether, or else dispose it to slough off in granulate, making an incision thro' them exposing them to ye air, or passing a Cord thro' them. Generally speaking ye first is ye best method, & in ye Palpa in particular it can be executed w^th great ease. Before I know ye nature of ye connexion of ye humour to ye Integuments & to ye Cranium I caused ye Surgeon to make a circular Incision of ye Integuments, & to dissect out ye bag entire; which was tedious & painful, but on examination I found that ye real Cyst, ye bag containing ye matter had little adhæsion to ye common Integuments, so that I could separate it w^th ye point of my finger, that it was not necessary to use ye knife. So ye next I and w^th caused ye Surgeon to make a

lenticulina

Dust forever y^e y^e long way there
time a pair & pull away y^e foul whole mor-
tal mixture, & coming to her other immortal
self, instead of calling into the mist y^e
wind of y^e anger he turned in mortal pale
colore. By the by, this cave explanation, would
disprove us to think, that there may be
polygydalides. But in general in other stories
of y^e body, such bystro are certainly connected
y^e method of healing, them therefore is
plainly this, Cause y^e tegumente are not
so pellucide, if y^e tumor does not give y^e
wine of an orange, we scarcely more to call
it any of y^e stain, provided it is not
diseased, but we merely make a long-
tudinal incision then instead of following
Authors, in attempting to take out y^e
bag entire, having dilated it a little
so that we can get hole of it cavity, we
impinge out hole it, when we can more
rate it w^t. y^e knife more readily, if
no longe useful or needed is conliqueure
but if there is any hæmorrhage of calling
there, we leave it, & y^e succeeding ones
pierce

...tain will make of his proclamation, I know
not, there is no danger of rebellion, nothing
can appear that part of the bay to the
N. Eastward of Mr. Mr. That Stevens
applies to Mr. Mercers Letters, but
there remains one more to the Westward
to call Yanquian, which is by Virginia called
the Nuova Nuceva, but I shall make
have overlooked those Nuova around every
one of the Gentlemen, not to have many
made it by giving a violent blow through
the paper, but with the pencil to prevent
that, which by you make the
great safety. That I am much persuaded
that Gentlemen have less sensibility than
is commonly supposed, yet I dare recommend the sliding upon the paper the
cause of the Inflamm. which might follow
a small Cut run that with a pen
will be the best method of cure.

Yet one more consider the matter
of the Medals. Authors have considered
that as emptied, they operate by a pen

indeed it, & not the former of a single particle of fat
, a fattide so enlarged so as to form of a mytiform.
Now both these opinions are wholly superficial
for a Malcolm consists of Millions of particles, & has
in all respects of same general Structure, as any
other same part of of fat, as far we can be assured
of with of Microscope, there are small bags collected
into lobes, & these are tied together by of common
reticular or Cellular Substance. Kept there is
no general byt containing of whole mass, but
of subdivided byt is merely of Cellular subst:
conceived, as by blowing into it we can change
it into a reticular matter. Upon of whole of more
one thirtieth of of manner in which it may be
produced, of more he is apt to account for
of cause of it, It is not an extension of si-
gnial parts, but a small collection of new parts
added to a particular spot of of Body having
of same structure as of rest, the degrees
of consistence vary very much, we cannot
find it not firmer than sponge, & in other
cases it approaches to of hardness of Cartilage
or we find a mixture of a reddish Fleshy like
substance, Many as Winslow &c advised

course a Scalon in the mouth of y. wth, by
applications of purgeing & sanguine will lay
blisters of heat over them. But all such attempts
are not only fruitless, but hurtfull, for in order
of succeeding in obtaining y. Growth, we can'd
do any thing which will more promote it, what
ever irritates y. part makes it swell, so we
would lay aside all thoughts of that kind, nor
as respect to medicines, we have no volume
where a Scalon was put away by any course
Salivate have undergone long courses of Sicula
or Mercury, but to no manner of purpose
So if y. Scalon is so situated, that it can not
removed, we would never attempt to put y.
patient on a course of medicines y. canalled
y. Constitution, or use any outward application
yt is irritating, if we are forced to humour
y. patient, let us apply some innocent
substance, but if he will submitt to y.
proper treatment, it should be cut out as
soon as y. nature of y. disease is clearly
marked, because it is y. nature of it to
increase in a gradual & constant manner
& so becomes more dangerous, may at
it

it increases in size, it alters its nature, in y.
other y. produces a new matter from which
may arise a Cancer, master y. physician alone
can may come in y. place of it. He must
by y. manner of explicating it, if y. skin
slides any y. tumour, and makes a straight in
cision, draw it back, & take out y. abscess
& then it is of equal size, in few days y. skin
will recover its tone.

The next kind of Tumour is called Sar-
coma, which term has been applied in a very
vague way. The Schirrus of y. Testicle has
been called Varicocele, or Sarcoma of y. Testis
But besides y. Schirrus of glandes, substances
form in different parts of y. body, of a red
colour, nearly like of muscles, in many
of which entering them, but without any re-
gular fibrous structure, they grow from
y. throat, as in y. rectum, & low in
regard to these, many are not apt to return
if cut early, as even when they do return
it is in their first state, they do not
put on y. cancerous appearance. But
if such a tumour has remained long

it

it becomes unequal in its shape, & from irritation is more apt to degenerate into Cancer than ye scalene, so ought to be more attentive in making an early separation of it, & it was piece of plain direction.

The last tumour is of Schirrus by which we understand a swelling of such a nature as time, or from irritation, or when broke, & opened to grain from any cause degenerates into Cancer, i.e. if ye tumour has ulcerated, we now call ye disease Cancer, to which we before applied ye name of Schirrus. & as no part is more subject to this complaint, or more frequently requires an operation on that account than ye mamma shall consider it as a general example

We find then yt a Schirrus can be produced in ye mamma from external violence, as a blow, quick to a person in perfect health, & generally is a hard lump form in ye breast after a blow, & it remains for some weeks in it, should it break, probability is yt ye ulcer will not heal but run into a Cancer, & must of matter

a—

a general circumstance y^t Schirrus appears in that manner most readily happens in y^e conglomerate glands, for y^e conglobate that they swell in consequence of blows, y^e swelling does not end in y^e same dangerous manner, & this is to like wise true, where y^e disease breaks spontaneously, I'm so much that I never saw an example of Schirrus & Cancer beginning in y^e Conglobate glands, that it is probable y^t this may happen, as y^e acrid humours from all parts of y^e Body pass this way, but I have not yet met w^th accurate example of this, where y^e conglobate glands were y^e beginning of Schirrus, & of following Cancer, Vast y^e mamma is subject to swelling & hardness, from the office of giving milk, & y^e different diseases y^t happen in Nursing, We often find large tumours produced in y^e mamma from nursing, but that these give y^e name of Cancer where tumours form from blows &c. yet they are seldom degenerate into Cancer y^t my Father used to alledge, y^t he never had seen a single instance, I

may

may have seen one or two instances of real Scirrhus & Cancer from Nursing, but knowing to be so uncurable, I have repeatedly seen very great hardness continue for weeks & even months & yet I have ventured to apply a common discussing poultice w.th a weak solution of Sacchar. Saturni, & by this brings it to suppuration, & wounds heale readily. Lastly Scirrhus begins in y.e Breast, in a very insensible way, & w.thout any evident cause, particularly about y.e decline of life, when y.e Menstrual flux becomes irregular, or ceases entirely & it often creeps on so gradually, w.thout any previous marks of inflam.n y.t the tumour is of y.e size of a walnut before y.e patient is sensible of it, & it even sometimes remains weeks or months w.thout giving much pain. Now supposing y.t a schirrus shall form in this insensible manner, so far as I have observed y.e common progress is this, that in 6 or 9 months, from y.e time of discovering it, when perhaps it was not above y.e size of a Nutmeg, or walnut, it increases to

y.e

y size of ye Gland as many months more perhaps, yt size is doubled, or it increases to yt. size of yt. first. In some few but very rare yt. tumour remains wt. out visible increase, or wt. very little for a number of years, but this is not observed in more than 1 of 20 cases. After yt. tumour acquires nearly yt. size of yt. first, sooner or later, according to yt. situation, yt. pains of yt. patient increase considerably, he feels a pain in yt. part, & pains shooting to yt. axilla & shoulder, & now examining yt. lymphatic vessels & yt. glands, you will often, but not always, feel some of yt. glands just below yt. edge of yt. pectoral muscle, between that & yt. axilla, hard, tho' not much enlarged, not perhaps bigger than a bean & unless a person has been used to yt. feel & knows pretty exactly where to look, he might not discover yt. swelling. If then ye Surgeon not attending to yt. course of yt. lymphatics, would pass yt. hand over yt. parts & suspect yt. all was sound & soon continue gradually increasing &

& they are succeeded by thin dusky & unequal
to y^e large scabs in y^e axilla, & are felt by
relaxing y^e arm & by pressing y^e point of y^e
finger deep into y^e axilla. In y^e space of
2 or 3 months more, there is a discolouration
of y^e skin, & it clings to y^e tumour, it grows
rather thinner very often & unequal in
its surface, & often y^e matter is drawn in
wards, at last an erosion begins & spreads
very quickly, in y^e mean time y^e tumour
increases, & in some cases before y^e ulcer
has enlarged much it bleeds violently, tho'
it is not often that deep perhaps, ℥ XII of blood
or more will be thrown out, & it is readily
and without difficulty. Often y^e lucky crisis of
y^e ulcer in 12 months y^e patient generally
dies, & during y^e time she is very miser-
able, suffering y^e symptoms which are
described in every Book, & y^e effects of
medicines are given or not, for the Cicuta
or a small proportion of Mercury is given
y^e disease will take this progress in
ha of 36 Cases, so I would propose that
instead of placing our dependance upon
medicines

incidence, we should attempt to prevent ye effects of ye disease upon ye Constitution by an operation. But I find myself under a difficulty here in coming to a conclusion because several eminent writers have discouraged ye attempt of operating as to Cure a Rupture, & my Author here mentions that in the case, where he had ye operation performed not above 5 remained dead of ye Disease some years after ye operation. Now as there is no doubt ye this is a fact, & yet I find ye ye success of operating is much greater than has been supposed, I must add, that by much ye greater number were of ye worst kind. The practice of Surgery was then at a low ebb, in this Poland, they did not venture to perform operations, except in ye Capital, but temporized w^th their patients as long as they could then sent them to Town, & at length ye Cancer was extirpated, after ye mass of blood was thoroughly tainted. But let us consider ye matter, A person has contracted a Schirrus from a blow, surely it will not be said ye ye whole blood is tainted at ye first appearance, it takes a certain time

time before ye matter breeds in it, & ye bymphatic
glands do not swell for a long time, so there
can be no infection to ye tabrinq it out previous
to ye suppuration. But suppose not that ye ichor
was known spontaneously, you will say this would
fully show ye there is a cancerous indisposition
in ye body, so ye operation cannot
be expected to be attended w. success. Now I do
not clearly see that this conclusion follows
for if ye general mass of humours are so (dis
posed, how comes it ye ye tumour appears
in this single part, & not in both mammæ
at ye same time. But if ye very worst thing
can be produced by a blow, & ye constitution
tainted, ye tumour may begin without any
cancerous taint, & ye taint communicated
to ye other parts, so tht we remove ye cancerous
affection, & ye patient is cured, & we can
never pretend to say yt ye removing ye (di
seased mass can add to ye taint of ye blood
& ye only injury sustained is ye pain
(danger of ye operation, which are in com
parison slight. But suppose ye
have cancerous, i.e. an ulcer to begin

Jermin

first time, it is admitted that the ulcer may even
endanger the person's life whilst time, the
utmost misery, we suppose that by an operation
I cannot cure her, & that the blood is inoculated
with the cancerous taint; I am doubtful whether
a patient submitting to an operation, & that
never returns, suffers much more than by
allowing the cancer to continue, & I know that
many escape in such circumstances & situa-
tions, I have kept a pretty exact list of all
the patients I have attended, taking in account
all those cases where I have seen the operation
done in the Hospital, & I find that I have
attended 83 Patients, where the operation for scir-
rus or cancer in the Breast was performed
& many of them much later than I could
have wished; In several there were not
only schirri, swellings of the conglobate
glands, but ulcers in the Breast, I began
in the end of the 1766 & the last patient who
in whom was operated upon two years ago
(the disease has not returned, & the acct
is in this way. In one, the only case of
the kind which I have seen, & I have heard
of

of but one Ulcer. The patient was after unsuccessful
operation, without any very evident cause, to
uncommon quantity of blood evacuated, she was
sick all for several days, & in the night time
was seized with a fit, very like an apoplectic
fit, & she formerly had Hysteric passions &
had had one fit like to that of which she
died, 16 remain, of these in 5 only the disease
returned, & these had no account of for upwards
of 12 months, & half these of one of these had
had a return, so 16 remain, of these two lan-
guished, were valetudinary & died, of one I
gather 12 Months after the operation but I
shall add these likewise to the side of unsuc-
cessful cases. There are 8 still remaining
of one half of the whole number, & if no ope-
ration had been performed, there would not
have been alive two or three of the whole
number, in whom the tumour might have
increased slowly. So upon the whole I am
much inclined to be of the opinion, that we
ought to attempt the cure by an early opera-
tion. I have met with four Herpetic cases which
were cancerous, in one the leg was cut

off

y^e above y^d bone in another part of the thigh
shew yet not a single person disposed unless
in y^d case where y^e leg was cut off, & which
had some thing particular in it, after a tumor
which was evidently a steatom was extirpa
ted plates of lead had been applied, & cancer
came in y^d place of it; at y^d time y^d man
only tried, but he had uncommon resolution
& imposed himself y^d amputation, he lived
about 14 or 15 months, & had no return, but
he dropt down in y^d street in an instant
w^t out any previous complaint, so that he
not from y^d cancerous humour floating in
y^d blood, but from a sickness of blood,
perhaps Apoplexy, more especially occurring
from y^d want of y^d limb

It remains to shew y^d cause of this dila
tation, which are very simple, we shall
examine if we can remove y^d whole, & y^d
diseased, we see that y^d bowel has no
adhesion to y^d parts beneath, & that there
is no swelling of y^d capillary glands, or
if there should be any, if it is such
y^t we can remove it, we determine
w^t

w.ch regard to these glands, as well as we can by y.e feel stretching y.e arm, slackening it, and trying every posture. But if y.e patient is fat there is sometimes a swelling in these glands, which you cannot discover w.th y.e hand, but you will observe an edema about y.e breast & side & from y.e glands being in paroles, there is an effusion into y.e cellular substance which prevents its impeding y.e glands. Now by y.e by this shows y.e necessity after extirpating y.e Mamma of dividing w.th y.e finger just into y.e axilla. Next w.th regard to y.e mamma itself, we determined whether it adheres by moving it upon y.e ribs where by we know it is to still to do y.e operation & we will still be more satisfied, if we find next y.e on stretching y.e arm backwards no stretching y.e pectoral muscle, y.e motion continues, which shows that y.e cellular substance is loose behind, & that there is no adhesion to y.e muscle. Having determined these points, I would next proceed y.e altho a very small part of y.e breast be diseased, & unless it be of very great size

we

we must take out y. whole. for y. cure is not
convicuable, & y. pain not much greater. & y.
cure if y. stein is properly managed, will heal
in a reasonable space of time. Generally it
requires about two months, tho some require
3. To do y. operation we do not use long thread
to tie y. operation quicker, but y. common sort.
pd. The patient is seated on a stool, & y
Surgeon sits before, while an assistant places
himself behind him & one arm over each shoulder
to stretch y. stein & to take care of y. bleeding
vessels. Generally he keeps his fingers on them
when they spring, to stop them till y. operation
is over, but they should be tied up as soon
as y. bleeding is known, for much want
of attention to this a great deal of blood may
be lost. The patient never faints but when
faint, when y. bleeding stops, but after
y. incisions are applied, they like again
& they may burst out a 2d or 3d time. It
is rather y. business of y. assistant to have
a pair of forceps in his hand to take hold
of a bleeding artery, & never let out till
y. Surgeon tie it, The Surgeon ought in

Circular way as much of y. skin as he proposes to remove before the detaches y. gland, & y. Circle should be somewhat less than y. tumour, otherwise by y. skin retracting a much larger wound may be made than is necessary. He must then y. external Thoracic arteries coming out from y. axilla, & these will be enlarged in proportion to y. tumour, on y. other side he will generally meet with small branches from y. Internal mammary. Having separated y. skin all round, he puts in his left hand under y. gland, & detaches it from y. pectoral muscle, & supposing there is an adhesion of it to y. muscle, yt. is not to hinder us to do y. operation. Although tho' yt. y. incision of it was attended with locked Jaw, & other dangerous symptoms, but he was mistaken. The Surgeon examines from time to time with y. finger, yt. he leaves no diseased portion, he then looks for y. bleeding which he could not conveniently take hold of, draws them out & ties, & if he meets to take for swelled Lymphatic glands, he puts his finger under y. skin & examines them

them, if he knows that there are small glands in the throat, which he is beat out, he calls the Epiglottis, & serves for two uses, & there is no occasion to cut out a (circular) piece of skin as for the management of the wound it is perfectly simple, & will be explained afterwards

Now that we have removed the Tonsils?

Two, there is a danger of the divided returning we ought to do two things, first is to keep in an issue for ever after, without entering into any reasoning upon the effect of issues, I would observe again that a person never returns, whilst the wound continues to discharge freely, after the wound heals, it may begin to appear again as my Father made it a practice to direct an issue to be kept in the part, you allow it to heal all but a small piece which you direct with issue Ointment, if the Discharge is very large, & a portion of it only taken away, we ought not to make it in the Throat, but if the whole is taken away the issue answers best in the part. On account this Surgeon opened himself, for the

yt (disease) returne it will be in yt part — it
may be said that yt Surgeon hasth it from healing
but yt is a change from yt part to better
because it will probably have yt heal of it, if
we are prevented from having it there, we
may make it in yt other arm, especially if
we are to use yt same ointment, which may
procure swellings in yt Conglobate glands
so yt we can't be certain whether there come
from yt return of yt Cancer, or are yt effect
of yt Cantharides, & if we have any confidence
in medicines for yt cure of yt complaint, that
will surely have more effect in hindering
ye ointment it, so by yt time yt patient has
recovered yt shock of ye operation, she ought
to be put on yt Bath wt a minute & careful
diet, & she may buy a course of Pidula
adding every small quantity of Mer
cury.

Sect: 107

I shall not explain yt method of recove
ring Drowned persons, but am only here
to speak of yt operative part, referring you
to a very excellent paper published this
winter

under by Dr Fuller on this subject

He covers y. Body w. some warm substance
& draws a small quantity of blood thereby from
Jugular veins, as y. respects of y. head are
much gorged from y. stoppage of respiration,
& in supposing this attended to, y. general
view which we have is to restore y. circula-
tion of y. blood, you recollect y. experiment
y. when y. heart & lungs in cat cut, y. ani-
mal can move its body for y. space of an
hour. Life does not then immediately depend
upon y. circulation, but it cannot longer exist
without it, In some Animals a much shorter
or time than in others. There is an action
& reaction of y. nerves & circulating systems
upon each other. Now where a person appears
to be drowned, often y. circulation has almost
entirely ceased, yet y. vital principle re-
mains, but would be soon extinguished un-
less we restore y. circulation. So besides
keeping y. body warm, & endeavouring to
save y. respects of their load, we mechani-
cally propell y. blood by pressure & friction
& as soon as possible, we endeavour to

restore

restore y^e^ respiration by inflating y^e^ lungs, as to y^e^ passage of this, y^e^ passage of y^e^ Circulation has been in a great measure owing. Now as y^e^ most simple means of doing that, I would propose, that instead of clapping a tube, or own mouth to y^e^ mouth of y^e^ drowned person; we should blow y^e^ air thro' a tube put into y^e^ Nostrils, which is y^e^ natural passage for it. The tube is made to fill one nostrill accurately, & you press upon y^e^ other Nostrill, as they communicate in y^e^ Throat; & y^e^ mouth is kept shut by covering it w^th^ any close substance as a bit of paper; & by means of y^e^ air soon passing into y^e^ stomach; another person takes hold of y^e^ fore part of y^e^ larynx, & particularly y^e^ cricoid cartilage, & pushes it back against y^e^ Oesophagus, and in a dead body, stiff w^th^ cold (can make y^e^ whole Thorax move), as I could (do it) certainly where y^e^ vital principle), or warmth of y^e^ body remains. But if we need greater force we either employ y^e^ Syringe or Bellows, & we may interpose a double slip Leather between y^e^ pipe & Syringe, & throw

throw in heated air — — — by y. Syring. in
boiling water, it alwise to heat y. remedies
but it is proper to stimulate y. stomach,
Intestinal tube, & to fill y. stomach wth warm
liquer poured into y. mouth, or we can wth a
tube, having nearly y. bend of y. Male Catheter, & y. Syringe force a liquer over y. Trachea
into y. oesophagus, & we must throw substances
into y. throw as y. smoke of Tobacco, for wt
I have shown you an Apparatus, but it is
likewise of use to throw in warm liquor, as
wine & water, as a Stimulus to y. System
& we may by to bring on a Vomiting wth
y. Vinum Emeticum, for if we can bring
on a spontaneous motion of y. Diaphragm
& Abdominal muscles, it will throw more
effect than any thing we can do by art. For
injecting y. liquer into y. Intestines, we
may use a Syringe.

Going upwards to y. head, I find myself
obliged to say somewhat of y. cutting y. Sterno
mastoid muscle in y. Wryneck. Now. the
Sharp &c speaks of this as an operation y.
may be frequently necessary, yet I apprehend
very

very few cases will occurr where it can be proper
because there is generally a complication; it
does not depend upon a single muscle, but a
number of parts are concerned, or if the Compl.
should depend upon the action of a single muscle
the patient would probably not at first allow
the operation, nor the Surgeon think of it, &
after it has remained a length of time, it is
difficult to alter the nature. But should such
a case occurr, instead of imitating Sharp ligh
throwing in a sharp pointed Instrument
as the probe was, catching the muscle & divi
ding it at one stroke, an internal Angu
lar Vein is immediately behind the muscle
with the other we feel & remove, we
would open the skin with the first stroke then
cutting the muscle thro gradually with the
knife, we raise the last fibres of it upon
a furrowed probe. But tho upon this acct
such an operation will be seldom needed
yet sometimes the skin of the neck is contrac
ted by burns, & if we find that this affects
the situation of the head, it will be proper
to divide the skin, & in time of the cure
to

to turn y^e head & y^e other way, leaving an opening in y^e wound, which will fill up w^th granulations & flesh. The next cause (described as requiring operation frequently so called

Bronchocele, by which ought to be understood a swelling of y^e Gland improperly named Thyroid, lying over y^e top of y^e Trachea & not over y^e Thyroid Cartilage, where that swelling immediately, y^e Trachea is sometimes so compressed as to suffocate y^e patient. Dr Cullen told me of one case he saw of this kind, & Dr Gregory told me of another; & in Scotch we have an instance of a swelling of y^e Thyroid gland breaking into y^e Trachea & occasioning suffocation, so it has been proposed to extirpate it, but this is a very formidable operation & is not to be rashly undertaken, & such swelling occasioning suffocation is an exceedingly rare occurrence. I have seen 4 or 5 cases of swelling of y^e gland, in some of them y^e swelling was considerable in one case, not much less than my fist yet there was no particular Compression & y^e swelling was considerable is seldom

yet

to have as to grow: & as in other
cases it did not increase for several years, &
the progress seems very uncertain. I do not
however pretend to know any medicines y^t
will cause such swellings, & sponges
wch have been mentioned, but I have not
tried it, but I have tried y^e Cicuta & Mercury
I have pursued both to a considerable length in
two cases, & in both y^e swellings remained
without any increase. After what I have
one case, y^e Gland suppurated, & had not
much y^e appearance of a common scrophulous
sore, but had no appearance of growing worse
now, & I have not met with a single instance
where a Cancer accompanied or followed this
swelling, & I look with dread upon y^e operation, from y^e danger attending incisions
here, on account of y^e sustain^g being com-
municated to y^e nerves running down at
y^e side of y^e Trachea, when exposed to y^e
air, besides in such a case, from y^e large
swelling of y^e gland, y^e nerves seem to be
entangled in y^e tumour. Therefore wishing
ying y^t very worst case, y^t a tumour of
this

the lung gradually swells & reaches ye
y. patient is in danger of being suffocated.
would suppose y. we should cut out y. middle
part, to which y. trachea, probably adhances
will not succeed, & perhaps y. gland may shrink
in it, & we can do all y. is necessary for saving
y. person. The next operation we shall
consider is

Bronchotomy or y. cutting y. Trachea
arteria, where y. passage for y. air is
altogether stopped. I need say nothing wt respect
to y. safety of y. operation, excepting y. skin &
cellular substance, & thin muscles which we
can avoid cutting, & y. thin part of y. thyroid
gland, there is nothing divided, & understanding y. manner in which, Animals live
after y. person can breath thro a hole
in y. wind pipe, as well as thro y. natural
passage, it will appear evident that y.
operation, whether considered wt respect
to y. parts divided, or to y. manner of
respiration, is not attended w danger.

We must attend to y. different circumstances, which may occasion y. operation,

to

I shall only mention what I have seen in a dissection of a Dog, that if the Wound be made a little above the Sternum, it may be easily removed from before, & from this Instrument which is to be used for searching the Trachea how the swelling it is evident if the Dog have never performed the operation. But there are many accidents which render the operation advisable, & in consequence of which it has been performed. The Tuberosities have misled many persons by sticking in the Trachea arteria, several have happened in this place, & have a patient in Infirmary was suffocated by a bit of meat sticking in the anterior Cartilage, over the transverse Glottidis. But in such a case there is no other remedy but opening the Trachea as quickly as possible, & should not deliberate much about the manner of doing it, but would take any Instrument that was at hand, a Lancet, Knife, a pair of Scissors, & not merely reasoning upon it, the application of such an operation would appear to be very often necessary on account of the swelling, of the membranes

lining

lining of mouth & nose & of latter would in a common cold, we would be apt to suppose that such a swelling might happen in the Glottis (whose use I have, where the swelling of this membrane was the cause of Death) & of symptoms were very like to those attending Pleurisies many & perhaps more such cases more common symptoms proper to the disease might have been found out. Now such a thickening may not only come on suddenly, but in a very gradual manner, & parts of the throat may swell in the Quinsey Venena, & not many years ago a case of this kind occurred to my Father, where the person himself was desirous to have the operation done from the difficulty of drawing his Breath, but the night hearing, partly by the pressure & swelling may stop the passage & the air subsistances shutting in the Pharynx, may as well as those in the passage itself, stop respiration, & you will find instances of this in Heister, & part of the mouth of the Larynx, frequently swell greatly, as the Amygdalæ, where the same is

10

in just over y. throat. & there known several cases, where y. respiration began to be difficult from this cause. Sept tumours forming in y. nose & throat, or over y. trachea, but especially tumours that form within y. throat, may render this operation necessary.

I next proceed to shew you y. manner of doing y. operation, & treating y. patient. To begin y. operation wt. y. common scalpel & y. first incision is to be made longitudinally, for if we make it transverse in y. different states of respiration, y. wound of y. trachea would slip within y. wound of y. skin & respiration be obstructed. Now if y. operation is (done) merely to allow a Surgeon to perform an operation in y. throat a small opening may suffice. I am led by y. feel a little higher than y. cricoid cartilage & continue it downwards for two inches or so dividing merely y. skin & cellular substance. Then separate y. Muscles Sterno hyoidei from each other, & bring in view y. middle part of y. thyroid gland, which is thin, & I am next obliged to divide it, when I

bring

lungs in view of ye lungs of ye Trachea arteria.
Now before I divide ye Trachea, I allow ye effect
to bleed freely wch lowers ye P. a free bleeding
will very probably be of use for removing ye
cause of ye complaint, as when it is a swelling
of ye neighbouring parts, ye other reason is that
ye small effort (resp.) of blood getting into ye
Trachea is ye cause of a most painful convul-
sive cough. Now having allowed ye
effect to bleed freely, or if ye case is urgent
we take up ye large vessels, & clear ye throat
by dry (deep) sponges, or Aslringents applied, we
proceed to finish ye operation, which may
be done w. ye knife, that I would prefer
ye Lancett, taking one of a larger size
such as is used in opening a vein, & we
make ye wound in ye Thoracic, transverse
otherwise ye lungs would be apt to fall
over each other. There is no great nicety
as to ye place, we go as high as we can
providing we do not come too close upon
ye Larynx, we enter ye point of ye knife
cut between ye rings & make a sufficient
opening, longer than ye Epiglottis is long. We
must

wch endeavours to fill ye pipe to ye wound, then
at first that will not be necessary, but in
a few days it becomes so, otherwise ye stim-
ulous & retentions ye breathing, before ye cause
requiring ye operation be removed, we are
commonly directed to tie a pipe on wt a ribbon
which is dangerous as well as inconvenient
for as from ye slightest motion or from much
or violent collected, ye patient is seized wt a cough
he ought to have it in his power to withdraw
ye pipe when he feels it come on; & to replace
it readily. To ascertain ye proper size of a
pipe, I rolled a bit of paper, & breathed thro
it, we make ye pipe double, say ye inner
may be taken out & other left, in order
to clean it, say inner is made about ye
1/20 of an inch longer than ye outer; & they
are made long enough for any case, & to keep
ye pipe in its place, we use a common black
wt a semicircular piece of metal before, wt
a solder &c by which we bring ye hole in
ye pipe opposite to ye hole in ye Trachea, &
when ye patient feels a desire of coughing
he pulls ye pipe out a little wt his hand

when it is over the proper it back again looking in a Mirrour, After the cure is compleated, to shut the hole, we need only use a bit of plaich, & if the sides are callous, we touch them w.th a bit of Caustic. Where there is no necessity for maintaining the opening, we are to be cautious how we apply them (on going, as the air might get into the Cellular substance under the skin from the lungs. The next operation I shall show is done for a fissure in the lip called the

Hare-lip generally there is more a split in the lip, but in some cases this is complicated with a separation of the bones of the roof of the mouth from each other; & in some cases the fissure is continued between the maxillary bones into the throat, & in the velum pendulum palati it is rare that we discover such fissures in the under lip; & yet to assign the cause is no easy matter, the lower jaw like the upper originally consists of two pieces, but take the fact, that we are not well able to account for it. In some)

we have not a cleft palate there can be no use when it is called y. Velum Luminum, y. clearance being more frequent in y. Latins. The inconveniencies are evident, it hurts y. pronunciation of several of y. letters, it is inconvenient in chewing y. food, & more especially in Sucking, as Children can't grasp y. nipple wth y. lips, we can be excluded again, how if sucking is prevented we ought to do y. operation very early, but if y. Child can suck, which it generally can, as y. sides of y. lips are glued down to y. Gum, we ought to delay operating till y. Child is weaned. We can always before hand determine whether y. operation will be successful, only a sufficient looseness of y. parts is necessary, & if we can bring y. sides of the fissures together, we may undertake y. cure of both at y. same time, but if y. lips do not allow of sufficient extension, we can divide before we attempt y. cure of y. other.

The cure consists in making y. parts raw, & in keeping them Contiguous till they grow

grow together, some (wch wt ye Knife, others wt
scissars, & you would at first sight (perhaps)
prefer ye knife, & certainly operations wt scisso.
are to be (discarded as much as possible, but
in this particular case, I would prefer ye scissars
but they ought to have short blades, & long
handles, & to be every way strong, as well
blade shanks, & whether we operate wt ye
one or other, it have been in use to grasp ye side
wt a pair of forceps. The patient is seated in
a low chair, & ye Surgeon stands before him
The first step of ye operation is to separate ye
lips from ye Gum, which we (do wt a lancet
making ye separation higher than ye future
Incutting off ye (edges of ye wound, we ought
to be careful to (do that at ye very angle, so
we ought to bring ye two sides out together
sticking to each other, & I would rather chuse
to lay aside ye forceps altogether, as they bruise
ye part, & hurt ye patient very much, & we
can (do ye operation very well wtout them wt
our hand. Incutting ye right side, we stand
before ye patient, & for ye left we stand on
ye right side, & cutting ye thumb on ye out
side

(vide) & y^e fore finger on y^e inside, we stretch y^e lip in y^e most equal manner, shaving cut all y^e Angles, & made every part raw, y^e next office is to join y^e wound, but before we bring y^e parts together, we let y^e vessels bleed freely, & for restraining y^e bleeding, we may press upon y^e facial arteries, which passeth over y^e Jaws near their Corner, when y^e bleeding ceases in a few minutes. We might unite y^e sides with Stitches, & still more cavity w^ch plaisters, but why, by bringing together should we run y^e risque of having (imagined in y^e Cure) we might fail in every Stitch, & our chance could be the worst than at first, y^e lips not being so loose all before, we might join them by a common Suture but if it (does not answer) y^e parts we easily cannot alter it readily, so y^e most common method of (Cheselden) is y^e best, y^e passing a fine thread y^e lips, & twisting a thread round it; & I have made a addition of Steel pins to y^e pins, made like a tacca, & made to turn off, confining y^e pins there in some nicety, we lay y^e lips together accurately, for y^e smallest deformity of y^e red part is observable &c.

we

we pass y. sinol pin thro y. middle of y. lip, rather
a little deeper than y. middle, lest y. Natural
getting in prevent y. turne. We pass a second
pin very near to y. upper corner, but so yt it
should remain there, & having no further use
for y. steel points, we take them off. Another
piece of white Ribband would be sufficient
but here we make two if not 3. we may have
a thread for each pin, but one thread will serve
all, we apply it to y. undermost pin, lay
y. sides accurately together, & secure that sinol
then drawing together y. sides close, we in
like manner secure the other, & whenever
we observe y. lips do not join accurately
we can bring y. turns over that part, &
having made as many turns as are ne-
cessary, we tie y. thread & cut it away, &
there is no occasion for making a running
knot, for we can cut off that thread &
apply another, I shall not contented with
two I have caused to be added a couple of
plaistors, which are applied to y. Centre
& joined by threads, by which y. Centre are
supported, & y. whole is taken off from
y.

y^e^ pain. some^e^ of y^e^ Chirurg. have directed to take out these in 24 hours, but in all y^e^ cases I have seen, they were left for a week or more, & found any considerable inconveniency, & w^ch^ y^e^ certainly that y^e^ sides are almost or altogether united.

The same kind of operation will apply to every other fissure, w^ch^ y^e^ upper eye lid may cut w^th^ a knife, & caused a similar operation to be done, only I preserved y^e^ common shape made by Athletico w^th^ a round needle, & covered both eyes, y^t^ y^e^ patient might not draw any under y^e^ edges, or after a cancer of y^e^ lips, which is by no means an unfrequent complaint, & if y^e^ cancerous part be large it is a common piece of dissection. The only remark here is, if you will observe after cancers sometimes like to cancer, when y^e^ complaint is not cancerous, but can be cured by Mercury, at y^e^ same time not often must will heal cancers here, where neither Mercury nor Cicuta have any effect, & elderly people are especially liable to this, & y^e^ lips becoming loose then, it is an advantage y^t^ apart

w

be taken off from it; & we find that, after they are
removed, Cancers in ye Lips, are not so ready to
return as in ye Throat.)

Sect: XII

In this meeting, I shall explain a number of
those operations upon ye mouth, nose, throat,
&c, Surgeons have Instruments for opening
ye mouth, what they call Specula oris, but
except in a very few cases, such Instruments
are of little moment. They may be proper if
a person is insensible, & ye mouth closely
shut, as if we mean to pour liquor into
ye stomach of a diseased person, but if a
person is sensible, it is vain to use them
against his will, as we can't manage ye
tongue, but if ye patient is willing to
allow ye mouth to be opened, as for cancer
ye throat, but is afraid of starting, they may
do tolerably well. Next I shew you ye canal
for ye throat, we might cause ye throat
w.t any sharp pointed Instrument, but
w.t ye risque of wounding ye Tongue; so to
prevent any such danger, Petit has con
trived a canal w.t a Canula, which is
thus

thrown back wt a spring & by regular y. depth
my Father has added below like one of what
you introduce upon, & it serves for a regulator
stopping y. end of y. Instrument & y. part
we mean to vanish, we press down y. barrel
staving y. air a sufficient depth wt it
go back again wt y. Spring. So this is an
Instrument of real use, & may be employed
wt different views, sometimes y. thread
wants very gradually, as in case of
suffocating apoplexy, & after y. melting
it is discover to sustenance; & we attempt
y. sustentation by vanishing, or suppose
y. vein may think y. remedy worse than
y. disease, yet if y. melting is mortal
threatens suffocation, we ought to make
a trial of drawing blood from y. part.
Kept after smaller how formed in y. Imag
tube, before it, matter the magnet, it
is sometimes in danger of stopping y. a
ryng, or here it is proper to give a de-
charge to y. matter, as soon as you see
a fluctuation of it, as by remaining it
destroys more of y. sound parts. Sure
we

in a third part in which it has been used, when a part of ye Uvea has mortified, which sometimes (tho' rarely) happens, in such a case that part (whether ye whole pupil may be meant) must be taken off from ye round.

The next Complaint, or Operation I shall speak of is, yt in consequence of ye Synechia Antica being so small, when (the iron are) said to be drawn tongue tied, yt part of ye tongue is drawn too close down to ye paw, which prevents ye Chirurgeon from wrapping ye Tongue round ye missile, in pushing & drawing it (far enough back) into ye mouth, to make a sufficient incid, it may likewise prevent from pronouncing some of ye letters so readily, particularly ye hard c & g, as in come, go, pronouncing them (so) those letters requiring ye tongue to be turned much farther back in ye mouth. The operation is perfectly simple, ye only nicety lies in avoiding ye ducts of ye inferior maxillary glands which open at ye side of ye Synechia, and closely joined to it, so as cut ye

Synechia

frænum longer than y. usual, tak out a sharp
y. knife, thrust directly through y. substance
of y. tongue, through y. fore part of y. child's mouth
holding y. head & drawing y. tongue out, then
cut to slit y. frænum linguæ, then
we may make y. cut wth any common
knife, or histoury, or to be less in danger
of wounding y. tongue, use a blunt
pointed concave edged knife, & introduce
y. point thro' y. frænum, we draw it
towards us, or as y. knife is an ugly mea
sure wthin y. mouth, let us take y. steel
instrument contrived by Klitt, It is
called (Klitt) y. frænum linguæ
incw y. other hand sometimes so long, y.
child throws y. point of it back into y.
throat, & being vexed wth alienation
in that situation, is suffocated, & that he
has saved y. childs life by thrusting
y. fore finger into y. throat, & forcibly
drawing it back, as you ought to have
this in view as a possible case.

The next complaint we shall con
sider is y. Rana, or Ranula, or Bron-
chocele

Accn of some (or of this or Hydrocyl. joint.
Now by this Complaint which is called (and
because from ye size of ye Tongue, ye person
speaks like a frog) you are to understand
a Complaint which happens frequently, a
swelling almost always in ye very place of
ye inferior Mapillary gland, or between ye
gland & end of ye Duct under ye tongue, for
y most part on one side only, & it is to
tally different from ye Branchocele, or
what in English is called ye Mumps, or
in this Country ye Branches, from ye
swelling all round ye jaws. Now I will
not pretend to say y this disease con
stantly depends upon one cause, but I
have seen it successfully in 10 or 12 cases
depend upon stones in ye inferior mapil
lary gland, in ye Duct, generally at
ye very mouth of it, but not always, as
this in common, wt all ye other Ducts
is contracted at ye orifice, so a stone
beginning to form from ye saliva, is
stopped only when it gets forwards to
ye orifice of ye Duct, but in ye cases I
grow

gum farther back, & can may distinguish
alone at least an inch from it beginning
of duct, of Salival flowing along it mixt
it, but being in some measure stopped, there
is exact enlargement of it valid part of
of gland, which grows not only bigger but
harder than in natural, of duct in like
manner comes to be divided dilated, &
mucocel may even be turnd. Now where
complaint depends upon calculi it be in
perfectly simple, we merely make an incision
upon it alone & extract it, observing
exact situation of it duct of it gland
it it is just between it sublingual gland
& it tongue, & you next recollect it it incision
ought to be made at some distance from
it point of it, it sublingual nerve entering
there, but it duct is generally more superficial than it nerve, so we can divide
it upper & thin part wt safety, & turn
out it alone, & it surgeon need not flinch
at slipping it tube, it is not in his power
but it orifice contracts gradually, no
doubt if it ever heals altogether, but
it

y^e duct comes to have two orifices into y^e mouth instead of one, by y^e standing direction towards of this new orifice; y^e food & drink cannot get into it. Before I discovered y^e three glands more frequently y^e cause of this complaint was from a stone of considerable bigness, & following y^e common method of making an incision, & found y^e bag filled w^t saliva y^e salivary duct having burst, y^e person received quite well, a granulation succeeding & making y^e cure. In these cases y^e stone might have tumbled out into y^e cavity of y^e mouth, & not been observed. But except in y^e duct of this gland, I have not seen stones formed, either in y^e small ducts of y^e sublingual, nor in y^e parotid, that a longer gland, but from its cylindrical shape, & y^e narrowness of its side, there is not time given to y^e liquor to stagnate till a sediment is laid, which may increase by attracting y^e saliva. I have observed that y^e incision of this duct is normalem inconvenience

But an incision of y^e parotid duct

duct must have a very different effect when it is divided by accident, or in performing operations, or when the gland grows schirrous & we must cut the duct, you can't expect to unite the divided ends of the natural duct it is too much to allow of this, since the saliva runs along the face in a very disagreeable manner, so we must form an artificial duct to supply the place of the natural & this is very practicable. The French have proposed the making a slanting hole with a red hot iron, in order to secure the ends of the video callosum, but no material advantage is obtained from acting in this manner, as the ends will soon grow together again, when the burning through of later than this my Father proposed in the Medical Essays to pass a silver in a slanting direction, & keeping it in till the passage grows fistulous, to draw together the ends of the wound, but I shall show you a method somewhat different from this, in which I succeeded in Mr. Wood in one case, I shall explain it

of Mucosa very small Thread, put them round
a Bougee, & making a perforation w^t a perforator
put y^e Bougee in, & allowed it to remain
2 or 3 days, till it had made y^e passage
follow. Then had contrived for y^e purpose
a small Silver pipe, y^e length of y^e artifi-
cial Duct, put y^e end of it on y^e Bougee
w^t in y^e mouth, & pushing hard y^e Bougee
carried y^e Thread w^t me to y^e y^e pipe
till y^e wound in y^e Cheek should heal
& having removed y^e Bougee, y^e Silver
pipe was left in the place, & to keep it
there, laid in a little bit of lint, & tied
y^e Thread upon it, & closing y^e lips of
y^e wound w^t a Thread, y^e saliva runs
thro y^e pipe into y^e mouth, when
y^e wound had gotten some y^e Thread, w^c
was in 9 or 3 days, drew out y^e pipe
& y^e saliva recovered y^e Duct again. 'Tis
10 now 6 years since y^e operation was
done, & y^e patient finds y^e artificial
Duct to answer just as well as y^e
natural one. it often happens y^t
after a suppuration of y^e parotis gland

y. small ducts by y. suppuration are divided
, how in that case it must be impossible
to attempt this operation; as we could not
wound y. body of y. gland, & puncture y.
abument vessels into y. Cheek. But if
y. opening is in y. side of y. duct only
we may by y. effect of a slight touch of
Caustic, as y. parts may have grown fis-
tulous, after y. we by Compression, &
secure y. orifice by adhesive plaister,
but generally we shall fail, from y. whole
branch being cut thro' & where even a
small branch is concerned, a considerable
quantity of Saliva runs out in time of
chewing, but this is not attended w.
great inconveniency, & w. time y. wound
ed parts of y. gland will shrink, &
y. flow cease altogether, as I have seen
happen in y. extirpation of y. whole, or
a part of y. parotid Gland in a Scirrous
state. I have had occasion to treat 4
different cases of this sort, in y. first
y. whole gland was Scirrous, & might
soon have broke out into an open Cancer

We therefore extirpated the tumour, & cut the glandula parotis dura of the auditory nerve, was in a great part divided, it was followed by a degree of paralysis of that side of the face & particularly of the orbicularis palpebrarum In the operation there is nothing to be observed further than the arteries spring from above as well as below, must be taken up. Where the surface only grows tuberous, we may avoid the portio dura as there will be no sensible paralysis of the face. Among some of these cases there was a good deal of oozing of pellucid lymph, but gradually the gland shrunk, & the skin was closed.

We shall next suppose some substance has stuck in the throat. The danger of its shutting the larynx has been already mentioned, but suppose it to go further back into the oesophagus we remove it by an instrument, a piece of whale bone, & a bit of sponge at the point of it, but we must tie a thread to the sponge, lest it slip off from the whale

under him, & wt their it is proper y. ye
substance down into y. stomach, & where y.
breathing is obstructed, there is a necessity
of seeing this, or suddenly cutting it out
But before we thrust it down, we must
keep it in y. Throat a good while, & by
imitating y. Throat endeavour to bring
on repeated efforts of vomiting, for that is
y easiest as well as y safest way of discharging it. For y substances may
prove dangerous by stopping in their
passage, drawing other substances to
them & forming Balls, & once they have
got into y. stomach, we may quite ever
thought of throwing them up by Vomiting. But if y substance is such
as will dissolve, as a bit of meat
we would not use force, if y. passage
into is free, because y. Throat is
common wt y. stomach possesses ye
same power, at least after it shows
shall know them go down wt ease
& perhaps more than Subtriction takes
place. Next where y. substances
are

are large & y. breathing straitened, we use this Instrument w.t much caution as we may push y. substance more into y. lu.s of y. Trachea. Nept suppose that y. substance is such that it is dangerous to thrust it down, & yt we can't easily in yt manner get hold of it. We have accounts of this found by Dr Clayton, where a feather stuck in y. Oesophagus. The method he took was abundantly simple, he introduced y. whale bone w.t threads tied to y. sponge, & twisting it round, he entangled y. feather, & brought it away, altho we have hope to use a wire, but yt is attended w.t more danger.

Nept suppose yt y. Oesophagus is constricted from disease, which has been frequently, we have 10 examples of this in a Pamphlet published by Dr Mann at y. Hague, De Deglutitione laesa, & I have met w.t 6. That complaint comes on generally w.t out any evident cause, tho not always, as it may depend on lues venerea, which

in

in a particular manner attacks ye. Throat
The Oesophagus is partly constricted, ye. coats
of it thickened, & partly it is filled up by
a spongy kind of flesh, yt. grows out from
it. The thickened part may become
as hard as Cartilage, while there is fed
ness wt. it a sort of fungus, so there
may be a Cartilaginous ring near ye.
stomach, wt. spongy flesh acting like
a Valve, so yt. ye. patient swallows
wt. difficulty, but can vomit wt. ease
Now we can generally judge of ye. place
which is constricted, by observing the
patients throat, whilst he swallows
drink, when we see it swell out, &
ye. patient distinguishes it himself
by ye. distension giving pain at a par-
ticular place, tho he is in danger of
referring ye. pain to a wrong place
Now wt. respect to ye. Cure, some persons
have been cured by a Salivation wt.
Mercury, which is one of ye. most Risky
means in ye. way of medicines, but
it is little to be depended upon. I have
tried

tried it in Cases to no manner of purpose
it is therefore well worth your attention to
attempt some mechanical relief by operation
if at least may be punctuated by using
means, to dilate y. Oesophagus. do in y.
urethra, va there Bougees may be advance
& they may be endured when ya food from
y. nerve, we may contrive sd a pipe like
hollow tube, which will answer as a
Bougee, & also convey yon feeding, y. patient
y. might have died of absolute want
not receiving nourishment, sufficient
to continue life by glysters, that these were
often repeated, do by degrees we could
enlarge y. size, & lead them in y. next
posture, w. some ponderous substance
which would work its way gradually
in dilating y. passage, & y. ligament
being well oiled, ye passed down till
it is mechanically stopped, & we come
to know y. very place, Now supposed
y. stop in y. passage is not to be
overcome, we are treating a desperate
case, so we would try a dangerous
remedy

remedy, I would open ye vide of ye Wesophagus to cut
out ye convoluted portion; & it is possible to
avoid cutting ye nerves, that alone
gov attends every deep wound here

Sept^r as custom has introduced a
very absurd method of wearing Ear rings, we
ought to put in these in ye most easy man
ner, for ye Silver smiths by using blunt
Instruments occasion pain, & even an Inflam
mation which may prove dangerous, as
I have seen a swelling of an Erysipelatous
nature occasioned in this way extend
behind ye ear — Dr Hunt has continue
every proper Apparatus, a Cancel which
enters into a Canula; & we pushed ye
tube of ye ear w^t a Cork, into which we
receive ye point of ye Cancel, which is
followed by ye Silver Canula, we
then introduce a bit of Gold or Leaden
wire to render ye opening callous, &
ye operation is finished —

Sept^r I would observe w^t respect
to ye ear, y^t ye external passage has
been supposed to be more contracted than
it

it is in reality, & that preventing yt can to yt Drum, we can see euen yt membrane of yt Drum distinctly, only drawing back yt tube, & bringing it into a straight line wt yt opposite part, so that in this way we are able to learn yt cause of yt complt in yt ear, as of pain, suppuration, dullness of hearing, or yt total want of it, which may proceed from a variety of causes, some of them not discoverable, as lying deeper, but in other cases, they may be owing to an Instamt of yt membrane, & hole in it, from which matter is discharged in others again we find flesh growing sating round yt hole, or yt greater part of yt passage perhaps filled wt it, in other cases we find Polypi, in others again ossifications, while in others cases there is a difference in yt shape. Now as we can thus get to yt bottom of yt ear we would lay aside a method which has been practiced of making a hole behind yt ear in order to get into it, or suppose yt a foreign substance has got into

yt

y^e ear, must extract it by a pair of Forceps, or a small screw as in y^e case of a flea. thus in this way we can kill an Insect, or we may kill y^e Animal by Drowning, Insects by killing y^e ear w^th w^ch will stop their breathing pores. but most commonly y^e Deafness of hearing &c. proceeds upon wax collected in y^e ear. Now people suppose y^t if they have wax in their ear all is well, but 'tis merely a defence to y^e ear, & when collected in too great quantity occasions Deafness. & several Surgeons have been affronted by Patients for not attending to this circumstance. At y^e same time we are not to remove it by y^e force of Injections. D^r Haygarth has shown y^t water & y^e best Menstruum for it. Some would only use y^e Syringe to throw in water to soften y^e wax, or to wash out what is loose, but would bring away any hard substance w^th a probe introduced. Nay y^e internal meatus, or Eustachian tube may be sometimes in fault, & 'tis has been sometimes proposed to throw Injections into it. But we can expect very little benefit

from this, suppose y. y. labyrinth is
inflamed, will y. squirting of water against
y. mouth of it remove y. inflam.? we might
as well think of curing a Catarrh, by squirting
water into y. nose. I know however that
this can be done w.t no great difficulty, by
means of an Instrument bent to y. angle
which y. tube makes w.t y. nose, we turn
it gently downwards, & pass it along y. septum
of y. nose, till you get it into y. Throat
when we readily direct it into y. mouth
of y. Eustachian tube. Suppose nepl that
this tube is altogether shut, as where a poly-
pus in y. throat has continued for a length
time, & brought on a dullness of hearing
which remains after y. Polypus is removed
we may in such a case conclude that
y. Eustachian tube has been shut, & to
make y. matter more certain, let y. pa
tient expire w.t all his strength, stopping
y. mouth & nose, & observe if he feels
a crackling in y. ear, & again owing to
y. ear air stretching y. drum, & if this
is altogether manifest, we may presume
y.

y^t y^e tube is stuft, or contracted, we may introduce a tube, & bring it near to y^e Eustachian tube, & thro' it entering a pointed substance, we make an artificial opening, then w^t (drawing y^e Perforator) we would introduce a bit of Bougee. The attempt is not dangerous, but supposing y^t we fail, or y^t y^e end of y^e tube is altogether wanting, there is one prospect which I have thought of, that as y^e cells of y^e Mastoid process communicate w^t y^e cavity of y^e Tympanum, & y^t y^e use of y^e Eustachian tube is merely to convey air into y^e internal ear, we might admit y^e air thro y^e mastoid process, procuring it open by a bit of Silver tube.

Sect: 100

At this meeting I proposed to explain y^e Surgical treatment of Tumours, situated in y^e Cavities of y^e body, to which however a Surgeon can have access, in y^e rectum y^e Vagina, y^e mouth, y^e nose, y^e larynx & Pharynx, & Oesophagus, I think it

best

heal the vena sepetitum, & consider them under
one view, both that of operating
in similar & of the humours forming in those
places approach more nearly to each other
than is commonly imagined. Guided by reason-
ing we discover a sameness of structure
in all of the membranes, the like qualities
& they all separate mucus in large quan-
tity, & comparing the several excrescencies
we discover a great resemblance, some
things however are special, & therefore
I shall make a few remarks on each &
shall begin with

Haemorrhoidal Tumours

It is generally supposed that the veins about
the anus become varicose, & that the danger
of Haemorrhagy here is proportioned to the
size of the tumour, Now I am certain the
Haemorrhoidal tumours resemble those
we find forming in the throat, or in
other places, That there may be some
real danger of an enlargement of
the uvula, I would readily allow, but
it is seldom such that we can discover

on

or demonstrate it by dissection, & where yt. Tumour bleed largely, or burst suddenly. This happens in yt. very same way, as where a polypus within yt. nose bleeds largely, there is an erosion or rupture of yt. vessels, & if yt. tumour has its vessels eroded within its substance, or is covered by a tough skin, there is a considerable increase of size, from yt. effusion of blood not from yt. dilatation of ye vessels. But there was first a tumour or solid substance an excrescence & in consequence of this increasing, & some of yt. parts being eroded there was blood extravasated. But I do not find that we can prove in any instance yt. yt. veins about yt. anus are gradually enlarged to a Varicous state; but there is many such an enlargement as happens in every part of yt. body, where tumours form, perhaps more readily here, because of yt. office of yt. part, yt. nature of yt. contents yt. irritation of these, yt. accidents from sitting on yt. part, & yt. effect of yt. unequal distension of yt. rectum, which occasions tumours more frequently here, & more

reading

[illegible] than [illegible] when [illegible] [illegible]
of that Idea be established, I assure them it will
alter very much any opinion we may [illegible]
respect to y. utility of persons having such
Complaint, from ito remaining after discharge
& that we may as well congratulate one for
having a plethoric growing within y. nose
as in having such formed within y. scrotum
Both when formed & when but formation
of urine is discharged from them, become
in some measure useful to y. Constitution
a plethoric Constitution is gradually introduced, but we would check y. beginning
of both, & tho' I am readily to allow y. in
many persons y. Constitution is disposed to
prepare more blood than is proper for it
such persons ought rather to be attentive
in diet, & to promote y. usual evacuation
or nature with weak out some vapour may
of freeing y. Constitution of its load, and
stamen heidat tumours, besides frequent
ly discharging blood in very great quantity
freely by being exposed to irritation, they
give occasion to fistula, & are apt to de
general

generate into Cancer, which may make Money
into ye Cavity of ye Mouth &c. Now
communication between ye rectum & Bag
am therefore much inclined to believe that
operation in consequence of the marriage
should be more frequent than they are. for
I know that we often can eradicate them
cavity, can transform an operation, not without
pain to ye patient, but without material dan
ger & free ye patient in a few days of a
complaint yt has tortured him for years
more of those, I shew w.t a small pedicle
Tied a bit of thread about ye root, & both it
off w.t a pair of Scissors. I mention an
Bowie was convinced double ligature
was praised that ye root w.t a needle,
lied on ye two sides, whereby it was
removed in a few days. But if we cannot
remove them, or if they occasion no diffi
uneasiness, yt ye patient is contented
w.t palliating ye complaints, and do as
by avoiding what gives ye most pain, or
heats ye Body, keeping ye body open &
promoting free perspiration, as many
that

shirt will be of use in such cases. If the tumour is in a deep cavity, we draw the thread straight by making the reciprocal upon the tumour upon one of the threads. In a similar way we can remove with a ligature other tumours as the large aqueous of the Amygdala. This however is seldom necessary, as by medicines, attention to diet, operative & tending to the operation of the constitution, they may generally gradually subside. But if they enlarge so as to obstruct respiration & deglutition, this is one of the best remedies having first lessened the bulk of the tumour by scarifying. In like manner we may treat tumours forming in any part. Notice now a case where the thread grew schirrous & cancerous, & looking upon it having it off as a trifling operation we did not use the precaution, of a ligature, but one held the tumour down, whilst another snipped it off with a pair of scissors There was little blood for some hours but when the faintness from the terror had gone off, it bled most violently, &

to

touch a tongue, yt I imagine yt nature gave it me could not stop it w^t yt intention of actual sucking, till yt parts had sensible growth, when yt bleeding ceased & did not return; so yt in such a case you may aim at this danger by introducing a double ligature & tying on both sides of yt tumour.

Sept w^t respect to stopping in yt Vagina, there in two kinds of constitutions one sanguine apt to grow Cancerous, but generally they are soft, & tho in extirpating them, a roll should be left & yt tumour grow again, I do not find yt they are much disposed to run into Cancer.

Sept w^t respect to Tumours in yt womb, yt kinds I have seen are fluid as such w^t in yt Autumn, Maxillare, & not yt membrane lining yt Autumn falls w^t mucus, & as structure of this sack was same w^t yt & yt membranes, we may conceive it possible yt simitar tumours shall sometimes form in yt womb. Sept w^t in yt womb yt tumours

which

which from [illegible] in examining the [illegible]
[illegible] the [illegible] have generally their [illegible]
appearance, at first to give a [illegible] than
y^e natural membrane, y^e more especially
ally in Children, they are semi transparent, resembling a bag filled w^t Gelatinous matter, & y^e bag
is painted w^t numerous vessels, y^t convey the
blood, by reason y^e same substance y^t in forming
of a certain Clown it receives in a general
uniform manner, as in the first y^e note, that in
some Constitutions it remains still for a length of
time, & should there w^t regard to such be
means, y^t they irritated by sharp substances
by Astringents, or by caustic medicines, or
attempts to extract them improperly &c they
are disposed, if y^e not to left to grow upon
them not seen a case, where y^e mind
mind, in a Constitution otherwise sound degenerated into Cancer, they return nearly y^e
y^e same appearance as at first. But in elder
by people, where y^e Constitution is broke w^t
Venereal complaints &c y^e tumour takes its
rest, becomes hard unequal, is disposed
to blood, & if irritated first w^t cut any [illegible]

it degenerates into a cancer, but such cases are very rare. There is also another kind of tumour in the nose of a cancerous nature. I met with one case where at the top of the nose, & under the eye, there appeared a tumour like a clot of blood, not firm but of a vascular texture throughout, & every part when irritated was disposed to bleed. It occupied the whole inside of the nose, & the bone of the forehead. Still further back in the nose, where it hangs over the throat tumours form, but they are of a different appearance from those within the nose, they are of a firmer consistence, & appear uniform throughout, resembling in the whole the body of the nose in a sound state. Again in where tumours grow out from the Oesophagus they are more of a spongy texture, much softer there is a degree of constriction, or tightness now structure, complicated with cancerous & I have not met with an example where tumours forming in the Pharynx or Oesophagus, have either spontaneously or by irritation grown cancerous. Now as for the nature of these complaints, & I have already mentioned in general the treatment of Haemorrhoidal

tumours

tumors let us now consider ye. real merit of those
methods we have access wt. greater difficulty. I
need say nothing of ye. effects of medicines, for
as far as I have seen, they have none; Rhamnus
Iris, Mercury in Themen hæmorrhoidal tumors, Pulsatilla
nigricans &c., & ye only effect it had was to render
them more disposed to bleed, which might
have been expected, considering ye. Mercurial
origin from ye. vegetable, which are accustomed
not by ye. use of that medicine? I have also
used strong solutions of Alum, while nitrat
& muriat Sal Ammoniac &c. without any sensible
effect. I use safely caustic, wch. is a great
deterrent, so that if ye. tumour is small
& soft, we may succeed, but if it is hard, ye
matter may tell impression, wch. is ye.
main reason. independent of ye. pain, &
inconvenience attending it, for as soon as
a fleshy substance grows beneath it, as
yt. after some weeks, it is as large as
before. It remains then that we attempt
to extract them by Instruments, & here
there are 3 evident methods, which
may be attempted. 1st the cutting, 2d. wt.

a knife or wth scissors, we use knives of diffr
ent shapes, according to ye situation, ye com-
mon Dissecting Scalpel, ye straight probe
pointed knife, or a concave edged probe point
ed knife, or we employ scissors of various
kinds adapted to ye shape of ye parts. At ye same
time I would advise you to use those cutting
Instruments very seldom: Nor surely is re-
sonable to tie ye vessl of ye Tumour, because
we stop ye bleeding, may we can go deeper
wth ye ligature than wth ye scissors, & tenderness
will acquaint where you can reach ye bottom
of a Tumour wth ye knife or scissors, where
you cannot apply a ligature to it. So I would
have ye knife or scissors in necessary as can
last ye occasion, & great attention to
ye putting on of ligatures, which we may
do in a manner always. For putting ye
knot in deep seated Tumours, we use
ye ring of Hildanus, & use a bit of flat
put for our ligature, which is strong
& being soft & pail does not cut readily, &
it should generally be soaked liquid, na
tural Surgeons call their knots, &

by

by making y^e ring of Silk Ligature w^ch a knot such
we can conduct y^e thread to y^e bottom of a tumour
in y^e Thorax, or Abdomen, or if that cannot
be done during y^e time y^e patient can not
from Breathing, it may be necessary to per
form Bronchotomy. A Double Blow pipe
is also used by Surgeons for making fistula
particularly Dionis has applied this In-
strument w^th a Silver wire, yt is very
flexible, for y^e extirpation of Polypi w^th in
y^e Vagina; & y^e same method will apply
to polypi in y^e throat, contrary to what
he has supposed, pushing y^e Instrument
thro' y^e nose. When y^e Silver wire is at
quite in y^e throat, we lay hold of it w^th
y^e finger & put it into y^e mouth, & push it to the
hind of y^e tumour, then pressing down
y^e Instrument on y^e tumour, we allow
it to remain, securing y^e ligature, &
generally in 3 or 4 days it will be
cut thro' without y^e loss of much blood
Next suppose a Polypus far up in y^e
cavity of y^e nose, where we cannot
get at y^e root w^th y^e ligature, we choose
a

a clean day, that in ye time of ye operation, we
may see ye root wt ye light of ye Sun. we take
hold of ye tumour wt a small paire of forceps &
scan to shutch it, that ye Surgeon may con
uel ye extracting forceps scan to ye root.
(See a figure of them in Sharp) & it will
be generally got away scan ye root, which
is scarcely less than ye root of it. we then in
troduce a piece of caustic wt a common
quill &c. to stop ye bleeding. & destroy ye
root, & we can in like manner introduce
caustic into ye throat wt a spunge fastened
to, or suppose of. by touching ye root wt
caustic, you cannot stop ye bleeding, or suppose
that a violent bleeding of ye nose occurs
from any other cause, I Dean has sug-
gested a method which is very practicable
ye stuffing ye nose before & behind, to prevent
any more blood from being discharged than
suits ye laxity of ye nose, He orders a tal
gut thro ye nose to ye throat, pulls it out
at ye mouth, & takes a piece of sponge tied
dipped in some plaistery substance, form
ing an oval about ye size of ye last
joint

joint of ye. thumb, wᵗ. ye. fingers of the (right hand into ye. throat, & pull it into ye. mouth shewing them pulling another piece into ye. mouth till (he) he pull them through together - -

Then mentioned ye. other day a structure of ye. Oesophagus, how we may treat this case and (de)struction of ye. urethra by (throughout perforated first ye. nose, or by such a substance made hollow, we would convey nourishment to ye. patient: (In supposing a tumour (deep) seated in ye. Oesophagus, we could force a wire first ye. nose into ye. Oesophagus then, (if) ye. patient mated ye. effort of vomiting & having spread ye. wire in ye. throat & pushed it (down, when ye. patient again swallows ye. tumour, it will carry ye. wire to ye. seat, & will wear itself first or by forcing a Capillary tube into ye. throat we can thrust it about ye. seat, first therefore a tumour be (deep seated) as ye. stomach, we may remove it) in this manner - - 6

(Vid. IIdly)

I shall proceed to treat of ye.

Wounds & as formerly spoke of wounds of ye vesture plants of ye Head, it now remains only yt we consider ye effect of accidents upon ye Cranium, wt ye method of remedying them by Surgical operation

When a blow is given to ye Head, ye Cranium & Cerebellum are affected by ye stroke, or a Surgeon speaks by ye Concussion, or Commotion & ye effect in this way may be highly dangerous & even fatal, i.e. a person by a stroke on ye Head any how given may be killed, & yet on ye most accurate Inspection, ye cause of ye injury is not discoverable. Now this at first sight appears very incredible, & yet a little reflexion will lead you to believe it, if you have heard of persons being struck down, or stunned by a blow, & remaining insensible after it for a few minutes, & yet after that time they recover perfectly. Now we more easily conceive yt ye person should die of ye

y Head. Hence y. he shocks & causes of common immediate Death are to be the most apparent as killed by Wounds, or Shocks Medically w.t all y. possible Injury being (com to y. Brain, or when a person puts forth a right Hand y. Head is not struck y. Brain may be disordered. Next in consequence of y. shock or concussion, w.t out any fracture of y. Cranium y. vessels w.t in burst & pour out their Contents, or y. concussion is y. cause of extravasation. Next in consequence of extravasation may merely from concussion, an Inflam.n & its sequela, suppuration may be produced y. shock irritating y. Brain & throwing it into an inflamed state, & thus there is not any effusion from y. bursting of y. vessels, there may be a suppuration, if there is effusion we understand how y. suppuration will more readily happen, that y. burst vessels will inflame, & y. serous part being effused into y. Seat of y. Body, & y. Inflam.n & together may be converted into purulent matter, & this last effect will follow sooner or later, according to y. nature of y. accid.t

y.

of evidence done to of constitution, of quantity liquor of sues, of treatment, than known a suppuration of me, without any of matter, in less than 14 days, which was evidently of cause of death & in Surgeons Hospitals are not fewer than 8, or 10 examples of so nothing, In other cases of suppuration forms much more slowly, matter forming several months, nay several years after of accident In two such cases where a suppuration was found in of Brain it could be traced from ind. of Blows given to of head, in one case 12, & in of other 20 years before (during all that time) they were subject to headache Epileptic fits, pain shooting down from of head to of back, sometimes a weakness in of limbs & these coming on in an irregular manner. So an operation may be necessary, where matter forms in consequence of sudden accidents, or where it forms spontaneously, or where it forms, after of patient has laboured under some particular disease, as of Liver Lung rea, Scrophula &c but even where no

remark

human (diocase) is divided in y. cavitulum ad. latum form in y. brain. . Yet y. assistance of y. Surgeon may be necessary in order to accumulo & retire y. effect of y. assistance in many diseases In Children y. Skull is not only tender, but much thinner than in an adult, & hence it is very generally believed yt. it may be depressed wt.out being broke. . You will not dispute y. more possibility of this, but it is a very rare incident. because even in y. youngest Child y. bone has a considerable degree of brittleness this notion has taken its rise from a circumstance you ought to be warned of yt. ariseth in consequence of a blow . A Subsequently well att, a person who had never been told, would imagine that he felt a depression. y. part yields in from y. humour diffused in y. cellular substance & gives limits to the feels y. Bone regularly depressed all round y. humour. In an Adult it is universally allowed that y. depression cannot happen wt.out fracture We must suppose y. depression inconsequence of a fracture, yt. a piece of bone is beat

heal inwards. It is evident that we ought to make it to ye former level, for a small swelling of ye Brain made suddenly produces ye most dangerous consequences & symptoms, but wt any depression, where ye Skull is broke, & figure formed, it will be a general good rule to apply ye Trepan, for then Damnified from alledging yt ye operation is wt out danger yet ye danger arising from a depressed piece is wt out, is nearly ye same as when ye Trepan has been applied, & ye wound entire, ye air has access that ye figure by applying ye Trepan, we give a free discharge, & prevent a large portion of ye Brain be comes carious, from causes whether external or internal, by means of this Instrument we take out ye piece, making a number of holes, one joining another in ye circumference formerly observed yt we must never think of doing this operation in cases of Epilepsy or where is danger from ye expansion of ye Brain to ye air, wt out any prospect of advantage. As to ye degree of danger, we are mainly satisfied to (die) after it

it is done, but we are at a loss to determine whether yt. discase, or yt. operation may have had yt. principal effect. That yt. death is not altogether owing to yt. operation is evident from yt. success in some cases. I have made repeated enquiry, in some I went thro' yt. skin & bone only, in others I cut thro' yt. dura mater also, none of them were dangerously ill but when yt. air was admitted thro' yt. dura mater it. air evidently had a bad effect on ye. tender membrane of yt. Brain, so that we are obliged to open yt. dura mater from necessity, we ought to cover yt. wound carefully keeping out yt. drefsings some substance dissolved in tough Ointment changing yt. drefsings to prevent yt. matter from growing acrid & so may injuring yt. Brain.

I have observed yt. yt. Symptoms of depressed Brain may be produced by concussion, as well as from explanation I have in yt. former. I have two cases, in operation only adds to yt. danger, while in yt. latter it is highly useful. Sometimes Surgeons have attempted to discover Symptoms of

dislocation

(distinguishing between them) they have treated of subject ingeniously, & they conclude that if yᵉ Diameter in from Concussion it is immediate, yᵉ patient is stunned immediately, but if it is from extravasation yᵉ impossibility will come on slowly. Now this distinction is not altogether to be admitted, because one would suppose yᵗ if from a blow given to yᵉ head, large & copious bursts yᵉ blood thrown out wᵗ violence may suddenly oppress yᵉ Brain, & produce yᵉ appearance of Concussion, & I have seen several cases in Morgagni &c that like way thing has happened, a person again will receive a blow, not be much stunned at first, but afterwards grow quite insensible, & yet on dissection one can discover no marks of violence. Now does not suppose yᵉ distinction accurate, yet I know do one knows, yᵗ yᵉ patient may not have suffered in both ways, & how that he may recover from yᵉ Concussion, he may afterwards be distressed by yᵉ extravasation so no absolute rule can be laid down

here

from that he may examine from the examination he may be enabled to distinguish these, but we must allow to y. Symptoms, & if y. Antiphlogistic method does not remove them, & we can discover y. part injured, we ought to apply y. Trepan, we y. I proceed now to show you y. different steps of y. operation (y. manner of executing these).

The Surgeon means to cut out a circular portion of y. Bone, so must have a circular saw, which you will find used for us to Trepanning. he turns it by fixing a proper handle to it, when y. handle is such y. we take hold of it, & twist it w. our hand it is called a Trephine, & probably in y. rude state of y. art, they knew, of no other, but when machinery was more improved, they came to employ such a hand as Workmen commonly use, & then y. Instrument is called y. Trepan. Now this last is in general used in all y. Countries of Europe, excepting in this Island, it is a verie handy Instrument, & we cut more easily & equally w. it, than w. y. Trephine

pointed

phine. Wch yt Trephine, we are not able to turn more than ye quarter of a circle, whereas wch ye Trephan we turn ye compleat circle & more out & in times so much in ye same space of time. Lest in case to be able to turn ye Saw exactly in a circle, there is a Centre pin, which we remove as soon as ye Saw is certain ye place into ye Bone, which we (do wch ease, & to get ye Centre pin to cut more easily, we have another instrument formating a small hole. In time of sawing we have a common probe, or a pen cut for taking out any particles, & so some of these may click in ye Saw, & hand must take them off, & yt he may not be clogged, he has two heads of ye same size, so that he may give ye one to an assistant to be cleaned, while he proceeds wch ye other without interruption. After ye bone is to leave, he lifts it up with a crooked pin, & if ye edges of ye circle remain rough, we are (exerted to scrape them off & to raise ye depressed parts in by means of a crooked pin called

Elevator

lvalors. We determine accurately as possible y.
place which have received y. blow
many difficulty, y. whole head ought to be
shaved, & this will also be save by keeping
y. head cool. We examine y. tegumento,
we feel y. bruised parts thickened, or we see
them discoloured, or when particular places
are touched, y. patient shrinks, that he may
be in some measure insensible, enlarging
y. hurt part, you will observe some matter
of his legs, or arms. If y. injury has been
received some time before, that there is no
hurt in y. skin at y. same time, very often
tho' not always, you will discover y. tegu-
mento affected, as often always, we find y.
tegumento puffy, where y. internal mem-
branes are in a sloughing state, which
mark will often occur, because each
an injury as is communicated to y. inter-
nal parts will affect y. bone, its dysto-
& particularly y. Pericranium, or external
periosteum, which will be in a slough-
ing or discased state. They will grow
thick & edematous. But we are not to
take

take his reason for it that it depends upon
ye communication of ye sockets now by that there
are so many communicating, yt if ye one
on ye inside are separated, as usual, thereupon
be such a separation of ye outer side, ye
inner side may be draughting, w.out ye outer
being affected, of which you will see instan
ces in Morgagni, as ye external may be pusht
w.out any disease in ye internal membrane
so we are not to have recourse to ye operation
from ye appearance unless it is accompanied
w.t Symptoms of an oppressed Brain; suppose
ye place marked nearly, we wish to have a
full relation of ye whole Injury before ye Trepan
is applied, & we do that by taking off ye Tegu
ments. But I would not use ye circular
or oval piece, we usually first
make a straight incision near to ye place
& we only continue it further when we have
seen ye state of ye Cranium, & we operate
where ye Cerebral stroke has been given
& ye several fissures considered, as then ye
depressed bone will be found. Having
thus determined ye very spot for ye operation

we

w^t cut out a Circular piece w^t a common Scalpel as much as will allow y^e Trepan to be applied w^t out touching y^e edges, & it is no matter whether it is exactly Circular or not, & you ought first to take it off loosely, leaving a good deal of y^e membranes beneath, Next we determine still more exactly y^e place on which we propose to fix y^e Instrument, & we endeavour to cut away y^e membranes from y^e bone & as the bone still remains so much coloured w^t membranes, y^t y^e teeth of y^e Saw, are apt to be entangled, or to slip, we are provided w^t an Instrument for scraping y^e portion of y^e head on which we intend to operate: Surgeons generally do this w^t too much freedom, not aware of y^e consequence of y^e external membrane to y^e bone, they ought to lay bare no more than y^e head of y^e Instrument will cover, the head of y^e Trepan is now made larger than formerly, especially if there are depressed portions which need to be elevated if we mean to discharge fluids only where there is no fracture, a small head may suffice, it ought to be still more exact as may

may apply y^e head of y^e saw to y^e skull near y^e centre of it; & y^t we may not misse of meeting we may fix y^e handle & make a little motion y^t we may be sure of y^e place, & not mistake y^e instrument we have for y^e purpose. Most Surgeons are so ample in y^e instruments y^t they cut a large hole, & y^e instrument vacillates. Most Surgeons put their head to y^e instrument; to give it a little more firmness. If y^e saw slides it will generally be owing to some of y^e pieces have been sawed off, sticking between y^e teeth at y^e sides of y^e saw, & we are not to think of getting y^e better of this by main force, but we turn y^e saw back a little to disengage it; when we can work with ease. You recollect y^e different cautions I gave when treating of y^e cranium, some special as a wound & laceration, & y^t y^e saw might turn of a leaden colour, when we get to y^e diploe but in many y^e two tables of y^e skull are compacted so much y^t

Have

[illegible] [illegible] [illegible] [illegible] [illegible]
in to take off y. saw very frequently & examine
y. depth to which we have gone. Formerly y.
saw was wood cylindrical, then in y. Cups of
Lead they were made conical, to prevent y.
saw from falling in upon y. Brain, & of late
years this shape has been again properly
laid aside, as endeavoring more closely & they
have substituted y. cylindrical saw, as a
great improvement. We are told further by
Sharp, y. we left out it. pieces more exactly
w.t it, but this shows y.t he continues saw-
ing too long, & y.t pieces as conical & mat-
rial improvement, y. we should never
think of cutting that y. bone entirely w.t y.
saw, for y. Instrument is in danger of
plunging into y. Brain, & when it is
brought to vacillate, we can readily snap
off y. piece. & little Splints remain, that
don't press in towards y. Brain, & we
can easily take them off. Say there are
not more left in that way, for we break
y. bone w.t out intending it. & then we
are more in danger of leaving that, for pieces
y.

y. danger of plunging in upon y. brain, yu recollect y. there are a number of sinuses, & blood vessels, by cutting these y. first, we divide these, whereas by snipping it off, we don't divide them, so y. in this manner we can work w.t. safety over y. sinuses, & that we have an example in Cheselden, where y. superior longitudinal sinus was opened & y. patient recovered, this is a very dangerous experiment, especially if y. wound be at y. back part of y. head, where these sinuses are large. A Writer in Germany has made Experiments on purpose, & he found that generally wounds of y. longitudinal sinus in quadrupeds proved fatal. The best way of lifting up y. piece is to cut out a portion from at each side, instead of pieces which are apt to slip. Dept Surgeons are provided w.t Instruments for scraping y. sides of y. hole, which has a Lip for receiving y. scrapings, but this enlarges w.t in y. head, & lessens y. substance of y. Brain, so we use in place of it a flat & very thin lady w.t

steps

slipo in w.t any danger. Now we need not be anxious about this operation, it is perhaps not at all necessary, but to prevent neglegence from having y.e piece raysed, we go round carefully which we do w.t out detaching y.e dura mater to any sensible distance.

I am kept to consider whether blood or matter be beneath y.e Dura mater, suppose y.e head depressed & blood beneath, we raise y.e depressed piece of bone & thereby discharge y.e blood, we have for this purpose pieces of crooked Iron, but they are used very improperly, The old Surgeons made teeth on y.e back to prevent their slipping in, Now we don't know that y.e side on which they are intended to rest is sound. So y.e Surgeon introduces y.e point of y.e elevator beneath y.e depressed portion, & puts his own finger between it & y.e other side of y.e hole, while he raises it, so that while he raises on one side he does not depress another, & would rather prevent that if it is very loose, it should be quite taken away. Whilst a piece of

bone

bone, the matter, how comprest w^ch^ pericranium w^t^ out, & dura mater w^t^ in, it will fill in the place, but if it is loose, or lax, it cannot fill up so considerable vesicles, we are not to open forcibly, but on examining the whole find some corner confined by y^e^ neighbouring edge of y^e^ bone, & we introduce two levators & raise it equally. If wpt blood or matter is confined, we open y^e^ dura mater w^t^ a cat, & we never ought to do this in a confused way, every operation of a Surgeon ought to be open & aperta. Supposing y^e^ dura mater we avoid its rupture, & if a small division is not sufficient, we can make a crucial. Sum. to have more force in raising y^e^ depressed bone, we use an instrument, y^e^ invention of Celsus. It has a rest on y^e^ sound parts, but it implies that more force is necessary than is usually advised. Celsus has a view for fixing y^e^ levator to y^e^ rest, but it cannot slip supposed wpt y^t^ we are to cut out a circumspect, some make a number of holes at half an inch distance, then w^t^

wt affonien & tuenien thy gut [illegible] lue
yt. shock' intuch' thro grieu is dangerous
Therefore we would make) an one cut Hall
into another, & yt mylue of pieces we yu
in, we find a piece loose, there is no occasion
for yt. Surgeon, if yt. opening is sufficient we
have only to remove yt. piece. But if yt a
piece is beat in & fixed, & we have to apply
yt. Trephan, we ought to lay some pubulance
over yt. hole, as yt. beard of a Oaten, or some
fine, after yt. operation yt. dura mater
to be dayl'd, & applied in a simple manner
to treat upon a moderate warmth, & to treat
wt yt. air, but we are not to use pressure
wt yt. view of preventing Sanguis, according
to Gooch, yt. danger is alleviated such
we cannot venture to make it, If Sanguis
grows from yt. dura mater, we may use
freedom wt it, & cut it off, or apply a
charolic pubulance, but if it is from yt
Brain, we beat it very tenderly.

Sect: III

We have now considered all yt. operations yt
are proper to yt. Trunk, & from next to consider
it.

y. different methods of treating y. part of y. circulating fluids shall begin w. y. discharges named Issues, which are form. in 3 different ways commonly

1. We apply a blistering Substance gen. ally prepared w. Cantharides, a blistering plaister to y. surface of y. Body, & we allow that to lye on longer or shorter time, according to y. age of y. person, or y. tenderness of y. part of y. skin to which it is applied. The head where y. hair is thick, requires nearly double y. time y. rest of y. body does, but no great nicety is required in this respect, because if y. fluids is separated, & water collected, its continuing a few hours longer does no material prejudice, y. tender skin beneath being sufficiently protected. We continue to dress y. place blistered w. an ointment, composed of similar materials, but where y. proportion of y. Cantharides is smaller & y. stronger kind of Epispastic ointment of our Dispensatory is y. best; y. weaker kind being scarcely sufficient;

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With time ye part becomes fungous, & yields vast quantity of matter, even in ye hardest part of ye skin, in ye head, soe a number of weeks ye hair (to here) breutle come, but wt time it wears out. It sometimes happens yt Cantharides occasions vlcers in ye tongue, they do so even at first, & in other persons after ye skin has been made tender for a while by ye ointment, & this may occasion mistakes in unexperienced habits. Soe in such cases instead of Cantharides, we may use an Ointment of ye common basilic to ye 1/2 of Ointment, which keeps up ye discharge wt out tendering ye adjacent vessels.

Ye Alle Pea (soue), where some round substance is thrust in to maintain ansine ning. One of ye best places for this, is at ye root of ye Deltoid muscle. We cut a hole for it wt ye common Scalpel, or we can stay a Lancet, & we may make first two spots in ye skin wt ye Point to determine ye length, then taking hold of it, we turn ye Lancet thro' & very readily cut it. If ye

turn

piece of y^e patient present y^t we [illegible] of
these Instruments, we enter y^e sore by means
of bougie, we lay on y^e part a piece of ivory or
tenne plaister w^t a hole in it, made as big
as y^e patient can bear it, we then fill y^e hole
w^t y^e powder, & lay over it another piece of
plaister smaller than y^e first, y^t we may
see it before it gets to y^e skin.

3^d The Seton, because y^e Ancients use y^e
Setie, or Briolles, for y^e forming it^t by this we
understand a cord introduced beneath y^e skin
& y^e method of doing it is perfectly simple.
Most Surgeons employ y^e Lancet, & y^e pa-
ty^e cord may be of Cotton or Thread, or Silk, but
we commonly employ Cotton; we take y^e skin
double, & have it supported by an assistant,
we may have y^e place marked, we introduce
y^e lancet thro y^e doubling, & draw it &
introduce y^e cord w^t y^e probe. As we know people
people are ready to draw away y^e arm when
ever y^e lancet is removed, & y^e skin being
let go, it is difficult to pass y^e cord, a needle
has been made for y^e purpose, or at this is
not sharp enough, I have removed a lancet
by

to be made with Stalk, & ouage to it.

Now the openings so made are to be used in ye Sea Horse, we introduce ye common Sea or any other round substance ye swells a little or ye diminutes at ye same time, as ye unripe Orange or Curasoa apple, or piece of Gentian made round, & an agreeth of new stock it is in danger of pushing such substances out we first them in dry sand, as with a hil & pour boyld with linnen. The opening of ye stalk is more easily fixed.

Now ye Bridle of Horse may evidently be applied to any part of ye bridg, but where we frame ye Sea Horse or stalk, we avoid ye bones, ye brown, ye ribs, ye bowed of ye subcutaneous veins & nerves, we avoid also ye swelling bellies of ye muscles, observing their Interstices, we it takes some little attention to discover ye most fit places, which are upon ye whole ye maps of ye meats for both between ye shoulders for ye stalk, or between ye ribs, where ye stalk applies conveniently in ye back we may form it longitudinally, when ye matter purveyed out. The Sea Horse

or

or it's Selan may be just in beneath yt. ribs, or in yt. loins, but still better in yt. extremities of ye body, in yt. superior, in yt. hollow under yt. Deltoid muscle, in yt. lower a bone yt. towards thor on yt. inner, or upon yt. outer side but I prefer yt. inner, because there is more Vein under yt. skin, generally these applications do better in fat than in lean people, being for the quenty. muscles, only we must avoid on yt. inner side yt. Vena Saphena, which we readily do by tying a ligature on yt. thigh before we form yt. issue.

Now what advantages are we to expect from these drains? Perhaps this is not to be altogether explained, but there are some things very manifest. 1 We draw off a very considerable quantity of ye worse part of ye blood in yt. form or it might rather say changed into pus, whereby we lessen a plethoric or fullness, so whatever advantage you can suppose in certain cases to attend discharges of blood or in yt. Haemorrhoidal Flux, may be applied pretty nearly to yt. discharge by issues. Next they certainly

voluntarily and in a powerful manner in spite of ye
utmost endeavours of ye subject. A person in ye fit
of a fainting, can have more of ye blood drawn
from ye same quantity of blood from his arm, and
suppose ye application should have a similar effect
May he survive it in fact I have observed that
a member in which an issue is formed
diminutive, particularly near to ye seat of
an issue. Then we must imagine that in
cases of internal suppuration, when there
is an absorption of purulent matter, an issue
will have a remarkable effect, for tho' pu-
rulent matter does pass off, when even
it does not pass off naturally, as tho' ye
wounds, ye naturally discharge ye serum
of ye blood. There is one farther view that
I am not quite equally certain of it, if
we form a new secretory plane. We
are very ignorant of ye cause of many
diseases. Physicians are divided about
them, as ye epilepsy, Gout, Asthma
whether they depend in some measure
on matter floating in ye general mass
or on a certain disposition of ye solids
but

all all these agree y^t y^e vessels are influenced
by y^e circulating humours, so much that drains
may have more effect than we have allowed
of. & my father who employed Issues for
10 or 50 years observed remarkable effects
from them in scrofulous cases, inveterate
headachs arising from various causes in
cases of epilepsy, in y^e Asthma &c. have
seen remarkable Instances of Issues relie-
ving paroxysms of Asthma, & many have
observed y^e relief they give in cases of in-
ternal suppuration, particularly in pec-
cumpline cases. But still me apprehends
a true perfect sufficient to determine us
& must refer much to future experience
the effect of all y^e Remedies is nearly y^e same
there is no such difference as many seem
y^e difference depending upon y^e quantity
discharged, not y^e quality, they all resem-
bling y^e same kind of purulent matter
may y^e Blister if found discharges just
of y^e same kind as y^e others, & what is
called y^e water of a common Blister is
y^e coagulable part of y^e blood.

He

We shall next attend to ye way of drawing ye
rest part of ye Muscles.

1 Wee do this w.t Leeches, or we scarify ye skin
w.t a lancet avoiding ye large vessels, & we
may puncture ye skin w.t a large lancet in a
number of places, or we do this more con-
veniently by ye Scarificator, which we may
apply to ye Temples &c. & we warm ye skin a
little, & relax it before we cut it. Besides
if we are to use Leeches, we may put them
into a common wine glass, & bring them to
sip in one place, previously touching ye skin
w.t Blood or Milk, which entices them
to enter more readily, & they are ye better
of being kept an hour or two in a dry Box
It has been alledged yt if you cut off ye tail
from a Leech, it will go on sucking as
long as you please, but on ye contrary, I find
yt ye pain given makes it quit its hold
instantly. But for ye most part they
bleed freely enough, & we have seldom to
consider of a method of stemming ye blood
especially in Children, where ye quantity
is sometimes so great, as to prove (dan-
gerous

greate, or ful wth Cinders affecting ye whole body, they ought to be applied where a Bandage can be put on, or we may be forced to apply a lil Sponge, & a compress wth a Bandage over it, & it is sometimes necessary to touch ye Orifice wth a lil of Situr Caustic. On particular occasions when we have to draw a certain quantity from a part we confine ye Animate to it, & then is necessary why we should not apply about ye place as often as necessary. If we want to divert ye Course of Humours, we have only to touch ye end of it wth again of Salt, or if ye Humour in applying it to ye mouth, have got down into ye Stomach, or if it is applied in ye case of Hemorrhoids, & have got into ye veins we kill & throw them out by driving or injecting Salt water.

Wash me pronounce ye Flow of ye blood by taking of ye pressure of ye air from that place. This has been done by exhausting ye air, as long ago was ye time of Galileo, he by means of a Cup, wth a hole in it, one had it out wth ye Tongue, then put in

ye

way, wipe from y. mouth into y. tube, then wash
(as y. same thing by means of a syringe. In
pulling y. tube out y. air is divided between
y. glass & y. syringe, suppose ½ in each, in
pulling it a second time all this of y. last of
y. remainder, as y. y. quantity in y. glass is
at last to be very inconsiderable. But we
may save ourselves y. expence & trouble of
syringes, by merely heating y. glass, which
may be done in two ways, y. glass may
be laid before a fire, or put into warm wa
ter, or we enter a small taper within y.
glass, which is better than burning taper
within, for that this is immediately extin
guished, on y. glass being applied, y. pa
tient is very much frightened. In remov
ing y. glass from time to time, we must
scarify with a sponge, a little nicely to
make them bleed again.

Now from this method what are we
to expect? The reasons of employing it are
y. in many persons, y. veins are so buried
in fat y. we cannot easily strike them
with y. lancet, or y. patient may see time
now

you to also use the method of evacuating
by drawing of blood Lastly but as frequently
have recourse to it in topical complaints
we open a vein in the neighbourhood of the di
seased part, as often as we see occasion for
the purpose of which I am considered before.

Next to an account of the ways of
using the lancet & I begin with the most
common operation Bloodletting, that may
be done with a fleam or with a common lancet
the fleam is very much used in Germany
& other countries, & it does very well in the
external jugular vein when the skin is
tough, there are no large vessels to be
wounded, & where a surgeon is not used
to the use of it using the lancet from
its greater depth, being carried in the
place opened by the platisma myoides.
But we can make the lancet much safer
to use, & instead of entering it perpendicu
larly we can enter it in a slanting di
rection, so avoid the arteries, or other
material organs, it may be pushed behind
the vein, & then not only cutting
with

wt. ye. seam where an artery is near ye vein as in ye. arm, ye thumb of ye. Lancet, ye. skin yields before it, ye. sides of ye vein are pressed together, & ye. artery may be struck thro ye. vein, we must consider ye. Lancet a little, & ye. way of letting blood wt. it, & I shall take as a general example ye. letting blood from ye. arm. I like to ye. use of ye. Lancet, which are generally made too broad in ye. point, so that they make too large a hole, & ye. danger of a large wound you are convinced of, by seeing if ye. bad accident happen in ye. arm, owing to a puncture of ye. subcutaneous nerves, at ye. same time I would not make them accessorily sharp, or spear pointed, which in ye. hand of ye. most dexterous Surgeons may wound material parts. 11th respect to ye. posture of ye. patient, if we mean to prevent him from fainting, we lay him in bed wt. ye. head low, we make a small orifice in ye. vein allow it to run slowly, & when (drawn ye. necessary quantity, we slacken ye. ligature slowly, if again we

a vein to bring on inflam- [illegible]
it, or rather vein, make a large orifice w.
a broad shouldered lancet. take y. biggest vein
for y. blood runs quickly. & having drawn as
much as we can do w.t safely, we slacken
y. ligature in an instant. Next y. Surgeon
must make y. vein swell, in order to strike
one of them easily & safely, by making a
pressure between y. part & y. heart by me
make y. ligature w.t a piece of cloth. which
has spring & elasticity. In pulling it on
we ought to feel y. pulsation of y. artery
at y. wrist, least we make it too tight
& if y. vein swell & y. artery continue to
beat, we must be under no necessity
of letting it in y. time of operation
which may prove very inconvenient
from y. blood getting out between y. vein
& y. skin. We apply it about an inch
above where we intend to make y. punc
ture, w.t out pushing up y. skin, & pass
it round twice, and turn (doubling an-
other, & we need only to make one knot
the Surgeon then takes the lancet out
of

of y^e. Tea cup^s another drink in which y^e. blood is
to be let, & he ought not to have it in his
mouth, which lanifies y^e. patient, & besides
he is to be ready in y^e. way, & ought to wait
a few seconds, y^t. y^e. vein may plump fully
w^th. blood, tho' then open it, bending y^e. lan-
cet to somewhat of a right angle, or a little
wider, if^t. y^e. scale do not come in y^e. way
& taking hold of it, we are to have it from
y^e. vein y^e. point, neither holding it near
y^e. end nor very near the point, but we are
to have y^e. full command of it, We are di-
rected to hold y^e. right arm w^th. y^e. right
hand, & y^e. left w^th. y^e. left, but if y^e. Surgeon
finds an awkwardness in doing this, y^e.
right hand applies perfectly well to both ways
y^e. artery may be more opposite to y^e. point
of y^e. lancet in one hand than another, but
that happens to y^e. right as well as to y^e.
left, & we would turn y^e. point of y^e. lan-
cet away from y^e. artery. The Surgeon
next fixes y^e. vein by y^e. thumb of y^e.
other hand, & with y^e. vein y^e. skin, resting
his arm on y^e. side & giving finger &

Incision of vein obliquely for when it is cut longitudinally, it does not bleed freely when cut transversely, it does not bleed readily, but cutting it obliquely answers every purpose, so he enlarges the lancet (direct) into the vein, till he sees the blood running along the side of it, when he enlarges the incision a very little, but the point of the lancet ought not to be raised, whereby more of the vein is cut than of the skin, so that the blood gets beneath the skin, the point of the lancet ought to be the centre of the motion & the surgeon makes the enlargement by raising his hand so soon as a sufficient quantity is drawn The Surgeon puts down his Thumb firmly on the vein, under the orifice, & prevents the from bleeding, but sometimes the blood recommends, so he puts the fore finger above the thumb wipes away the blood, & the vein sinks in a hollow he next commands to apply to the orifice, & over that a small compress, & a bit of sticking plaister but this should not touch the lips of the wound as it is apt to cause them to fester, then

he

he applies a large Compress, & rolls it over the
y. part in which it is made, he applies
a Bandage, if we want to make y. blood run
quicker, we cause y. patient to move his
fingers, & y. action of y. muscles will cause it
more quickly.

If we are to do y. operation on y. neck
y. general rules apply perfectly, we make y.
incision upon y. vein, some of y. Ancient
Surgeons have been at pains to contrive
machines to compress it, but they are useless
& dangerous, & y. Thumb is sufficient for
y. purpose. To make y. patient cough, or
we pronounce it to Cry, if it is a Child, which
makes y. Veins swell. If y. operation is
done on y. left side, y. Surgeon has only to
vary his situation, he takes y. head
of y. Child into his Breast, sitting on a
Chair.

Next we are to consider y. accidents
y. attend it. S. Shaw formerly spoke of y.
consequences y. attend y. wounding of
nerves. I next would describe y. blood
gets out from y. vein, without any
wound

wound of y. artery, between y. skin & y. artery causing a tumor called Aneurism, which if this occurs in time of y. operation, y. Surgeon either obviates y. stain in another place or takes off y. ligature instantly & notices y. compression on y. vein, or if from neglect blood have got out, unless it exceeds an ounce or two, in a few days it will be absorbed. But in some cases, where a great quantity is effused, there is a necessity of taking it out by an incision of y. skin.

The only remaining accident is y. wound of y. artery & its remedy. But before I first mention y. general way of opening arteries Mr. Butler has wrote a very ingenious Thesis on y. subject, & where we mean to open arteries of various sizes, I have pointed out a very proper method of doing it. We have a number of wedge pointed lancets of different sizes, & we have blunt lancets of y. same shape. Now Butler proposes to plunge these perpendicularly into y. artery, making y. wound either longitudinally or transversely. If y. first

sized

orifice is too small, & we cannot draw a sufficient quantity of blood, you take y^e blunt lancet for a conductor to a sharper lancet, & y^u perforate it perpendicularly likewise, & thus you go on till you make y^e orifice to your intention & this is necessary in experiments on Animals, but y^e only artery to be opened in Cleavers is y^e temporal, & this was done in y^e days of Galen, & for doing it in mayor y^e most common kind of lancets, some have tried to improve upon y^e common lancet, by taking away y^e shoulder of it, which is in order to pulling y^e artery, some carrying this further have made it concave but y^e making it straight answers y^e purpose sufficiently. Now if we are to let blood in y^e temporal artery, we endeavour to bring it fully & we prefer y^e anterior branch, because y^e nerves are smaller, & are not closely glued to it; & we make y^e opening rather longitudinal than transverse. There is a dispute w^t regard to y^e stopping of y^e blood whether we are merely to make a slight pressure on y^e orifice, or to squeeze it close

view of it by that, the fact is, generally speaking when men is commonly imagine but in effect there it is very troublesome, after have continue a neat instrument for compressing it.

Now from this operation, to return to the common place where accidents happen to arteries formerly mentioned amongst which the wound can be distinguished. Surgeons are sometimes frighten by the blood, the artery being communicated to the vein, but where we are in doubt, we touch the vein above with the point of the fore finger, slightly to find out any communicating branch from bleeding, & if the wound be in the vein we close it with the thumb beneath, but if the artery is wounded, the more strongly we press upon the vein the more violently will the blood be thrown from the wound.

The place it may occupy are in general B. Almost upon in the common tunicar substance, which happen in vein where the wound is large the blood rushes through it, & when it is very small, the

tun

or vibolane membranes are apt to confine it as apt a circumscribed tumor in form of a blood gets into y. Cellular substance, but slowly coagulates in it, & is confined by y. Apposition of y. Parts, on communication may be opened between y. artery & y. vein. Knowingly it is y. same thing, whether an artery be wounded accidentally or by design that is we cure y. wounds of arteries by common dressings, as if y. wound is large, & y. artery at y. same time large, we by ligature a strong compression upon y. orifice & use hard & firm stitches of sutures made by means of instruments. The Physicians of last Century heard of ligature, & we have an improvement upon it by Platner.

I now suppose that this method will not answer, we are apt to lay y. artery in view by an Incision, & then again by y. effect of y. Instrument applying to y. artery a gentle or Sponge, & we have a greater number of sutures made in y. way. But suppose y. we discover'd find this method deficient there is one

after

other method may be [illegible] to pass a small pin thro' [illegible] & thread about it, twisting it as we do [illegible] lip. But supposing yt. this is also in [illegible] it remains to tie up y. artery. to tie a ligature above y. hole & another beneath, & proved y. impossibility of saving either of y. extremities in this way, tho' y. wound be as high as y. upper part of them.

Suppose then y.t y. Surgeon is to tie up y. artery, I observed y. propriety of doing this, in wch there is an Aneurism wherein y. artery communicates w.t y. vein & we take y. following method. The patient is laid on a table or bed, & we apply a Tourniquet, which is managed by an Assistant. The Surgeon for y. operation needs to have ready a common dissecting Scalpel, a common probe, & a couple of needles ready in y. usual ordinary way, there being nothing unusual in y. manner of making y. ligatures, I mean what is of my proper invention is wounded suppose, I begin w.t a longitudinal

dial, & cautiously with the point of the knife of the scalpel to avoid the artery distinctly from the vein & Cellular substance; we are to bring in view of aponeurosis of the biceps muscle which the blood & the wounded artery are lodged from which always the blood is below the aponeurosis & the artery, this is in order where allowed the blood was behind the vein

Next, Divide the Aponeurosis, avoiding the veins which cannot in the way, take out all the clotted blood, wipe the part clean with a sponge, & taking in my right hand the probe, I put my eye on the place, where I expect the wound, & direct the assistant Surgeon to slacken the tourniquet, that the blood may rush out, & immediately introduce the probe into the orifice, bending the patients arm, & the assistant straitening the tourniquet readily the artery, & no doubt the vein (circumstance mentioned by my Father in the Medical Essays. II. page the two ligatures, including no more than one or two of the Vena Comites which

which it is not material to enter into now as we
are safe at y^e point, but y^e common practice is
also to use instrument for viewing y^e ligature
before we pull it, we desire y^e assistant again to slacken his Tourniquet y^t
we may be certain it is above y^e orifice &
having tied y^e ligature, we slacken y^e
Tourniquet again, to see if y^e ligature is
drawn to y^e proper tightness. We next prove
y^e other ligature for tying, but we
leave y^e preparing of from y^e artery for a
while, for if blood is discharged from y^e
lower orifice we are certain of y^e ex-
ceeding, when we tie y^e ligature. Have
sometimes thought y^t we might do some
what more, perhaps a thread behind y^e ar
tery higher, but it should be at first
but if it might be doing too much,
having fastened y^e first knot w^t a
, we make y^e ends so short y^t they
may be laid within y^e wound. We also
this keep y^e Tourniquet upon y^e arm
but quite loose, & an assistant also to
assist to manage it, that no great

quantity

quantity of blood may be lost before the Surgeon is called. The dressings are of the most simple kinds, & we ought to make no additional Compression upon the artery, which must be done by straitening the lateral Incision, so as to cover it with wool, or other warm substance to prevent the natural heat from escaping. The Aneurismal bag is treated nearly in the same manner. We recall to this mans Recollection, we might be influenced by (a) law, which says that the Artery breaks out before cut by the ligature. But this could shew that the ligature was drawn too tight & thereby occasion the operation to be performed without any accident happening.

We shall next consider the manner of doing Inoculation. I need say nothing of the advantages attending this practice, I had only another argument, which I know influences many people, that is in the natural way, where there is a considerable number of small pox they suppose the Constitution to be freed of some bad, as there is something known out which lessens the

Danger

danger; & they therefore perswade to say y^t y^e bills of mortality have not diminished since y^e practice of inoculation has been introduced, how if that can be proved, y^e argument have some weight, but it is no fact, for y^e practice has been confined to a few places, & y^e Bills of mortality are kept very inaccurately. But a plain answer is, y^t y^e small pox is not a disease y^t naturally attends y^e constitution of a man, does not arise spontaneously in all Countries, but arises from causes y^t we shall never be able to determine; & is propagated from one part of y^e Earth to all others now. Ancestors before y^e 16^th Century had no small pox, it is imported, & we might as well dread against y^e danger from having y^e plague in a slight manner as the small pox, a very great improvement has been introduced of late years in y^e method of management. To take y^e general circumstances, & 1^st respect to y^e age of patients, I think it is very evident y^t we ought to avoid, except in large Cities doing y^e operation while Children are upon y^e

y. Head there are many reasons to be given for this, but particularly at y. time of y. Eruption breaking out. Fits are more common at y. same time y. they are more dangerous, then y. small pox may mechanically prevent y. Child from suffering, even more being like to be at least years of age, y. after removing y. teething may be over. 4th regard to y. season of y. year, beyond doubt we ought to avoid y. heat y. summer & still more perhaps y. autumn but I doubt whether we sh. not even prefer y. spring season, & whether at not we ought rather to inoculate in y. extreme cold of winter, I am disposed to y. opinion. Inoculation tho' extremely illiberally, has done more service to mankind by introducing y. best method of treating this disorder, than any other modern proven, while Doctors his medicines are not more effectual than those in common use. The farther advantages of this inoculation are y. introducing y. matter not thro' y. lungs, but thro' y. subcutaneous cellular into y. general mass, & there is something to

pidus

we are now, which we perhaps shall never
be able to explain. Before y. operation we ought
to keep y. patient on a cool regimen, on a
milk & vegetable diet. & if a Girl he ought
to be habituated to bear cold which is very
apt in y. time of y. disease, but we are by
no means to expose him to y. same degree
of cold before y. operation, as when y. fever
has come on. As to y. other preparations before
Inoculation, generally y. best after y. latter
we introduce y. matter taken from a patient
presently labouring under y. disease, which
is supposed to have some advantages &
inbounde state, which is thought to give
y. infection in a milder degree we may
have y. patient in y. next room, & sometimes
a sooner, but if y. patient cannot be got,
we allow y. matter to dry on y. point of
y. lancet, only we soften it before we
introduce it, by breathing upon it, only
wetting it in y. steam of warm water, We
introduce it with a spear pointed lancet
to give little pain, & we choose apart
of y. skin which is not seen, as those
in

is often a mark left, as where we put issue about y. heel of y. deltoid muscle, we enter y. lancet under y. skin till y. child complains of pain, under y. scarf skin, & slightly into y. skin then pressing it down ing, we press y. scarf skin, upon y. tunic w.t y. point of y. fore finger, & we not find we have such punctures, we discover y.t y. infection is communicated from a degree of swelling in y. orifice, & hence & from this to y. time of y. Eruption, which is in about a week, we purge y. patient several times by a common cooling purgative, & we keep y. patient not only on a cooling Vegetable acescent diet, but we give y. drink cold, & keep him in a large well aired room, w.t little company in it. About y. time of y. eruption is y. greatest danger in young subjects & Mothers have given no particular directions about y. management then, Most practitioners when a child is in danger of growing sick, y. bids y. nurse fill warm water, wherein those

thus inviting Sutton expresse y. Child to cole
but without always pointing y. out a other
method, we ought to attend to y. state of
y. Child & if there is appearish heat y.
face flushed &c. we would have recourse
to y. cool regimen by all means wou'd
carry y. Child out to y. air give orange
&c. but if y. Child feels chilly shivers
& y. pulse vacillates, & is weak y. com-
mon practice is y. best, we would lay
y. Child in warm water wash them &
wet warm cloaths give cordials which
also have effect, thus adapting y. ma-
nagement to y. present appearances

Art: 112.

It remains yt we consider Amputation
or y. manner of taking off chiefly y. extre
mities of y. Body.

This operation is frequently per-
formed by Surgeons, when it ought to be
avoided particularly in Compound fract.
tures, where wt is breaking of y. bones
there is a laceration of y. vessels parts &

a pulmion of them. Beneath (as a Surgeon
finds it difficult, or impossible to replace the
members in the common manner, & therefore
proceed to amputation) but unless there is com
plicated with the fracture a violent contusion
of the neighbouring larger joints, the limbs may
be saved by cutting off portions of the bone
Thereon in diseased habits, large portions
of the bone can be regenerated, & this happen
still more readily where the constitution
is good, & in the last Edition of Goethe's works
you will find not less than 12 Examples
where the bones especially the tibia, have been
taken off to 5, 6, 7 Inches in length, & the
were supplied in the space of 8 or 9 months
we may apply what we find in those
cases a little further, viz. where a bone
is loosened, & there are no dangerous
symptoms prevail, the Surgeon may take
it out & trust to nature for the supply
In this manner if a bone is laid bare
& appears carious, Surgeons run to the
amputation, but we would first discharge
the matter in the bone by making free openings
in

in ye bone, which may be done w. common instruments we may apply ye Trepan here & in ye Medical Syringe you will find every described by my Father where I have more at large in ye way. we may cut out ye whole cylinder of bone & the Surgeons have not yet contrived more fit Instruments for doing yt. it may be possible the may get all ye bone w. a shaw, & by Chisels inspect. temporized, or we may apply ye Trepan in a number of places made at ye same time, to come in upon ye teeth of another which we have occasion to cut by we might cut out ye little pieces at once & take out.

Most Surgeons who do the amputation in scrophulous cases, for generally ye disease breaks out in some other part, may if nothing is done, yet less changes are made in scrophulous cases by nature than we could have expected. I have seen ye times of seven at having ye amputation delayed, where ye disease was in ye bone, & ye swelling

mat

now called a white swelling, but ye matter broke outwardly w.th out communicating w.th ye cavity of ye joint. But if ye patient have not ye disease in a great degree, & ye ye matter already formed communicates w.th ye joint, & ye patient in health & sinking under ye disease, would give him ye chance of amputation. But a Writer of great experience Bilguer one of ye chief Surgeons to ye army of ye King of Prussia in ye last War goes farther, & have wrote a Book against ye utility of Amputation in any case. The plain History of it is this. The King of Prussia for reasons known to himself discouraged & in a great measure forbid amputation, to be performed in his army. This obliged ye Surgeons to have recourse to other methods, & Bilguer tells us ye after one of ye Battles, he had under his care at one time 4000 wounded men, of that number 1100 were wounded in ye joints so ye Surgeons must have thought an amputation necessary, yet by making proper incisions giving ye Bark largely which he observes had a specific virtue

not

not only in preventing, but in curing. mutilation. circumstance of y. highest moment, as Sharp has taken y. pains of disputing y. usefulness of y. Navy, in such cases, & y. 100 treated 600 died, 900 recovered, but without y. motion of y. limbs being restored while y. remaining 200 had y. motion so tolerably restored, as to be able to do duty in Garrison. Now from this Comparison he rejects amputation, & alledges y. so many lives would have been lost in y. common method. Now I cannot help calling in question y. conclusion he makes. If you look into y. Medical Essays, you will find an exact account of y. whole 600 patients treated in y. Infirmary for amputation of y. larger Extremities, of y. number 8 only died, without making an allowance for y. accidents or y. diseases, which gave occasion to y. operation. Now we might expect greater success in a recent case, where y. patient is in full health, as Soldiers are, than in cases treated in Hospitals, & if any amputation had been performed

mistake

instead of 600 Wilgan would be have but but 180. But suppose not y. natural stamina y. better health of y. Soldiers in y. army y. inconveniences are not equal, as I shall hope almost y. number, & suppose y. 200 would have died. In y. common practice we have 200, whereas Wilgan saves but 100 - y. 200 w.t wooden legs, would be in no good situation, as where y. use of y. limb was not restored where y. knee was not completed but y. patients must have suffered pain, dragged their limbs after them as a useless load, & we have remaining 600 w.t wooden legs to ballance 200 where y. motion was tolerably restored, & where it was far from being very tolerably restored, whereas y. Soldiers in y. extremity y. thigh of y. Russia was often in would have been taken from y. Garrisons, so it is beyond all doubt y.t in y. common, manner of amputation, where y. limbs are much wounded, we save many more lives than in Wilgans method

I now proceed to y. close of y. operation

ation itself. That I may add one more observation. Bilgar writing to throw aside this operation, gives an argument against it where Gangrene appears, for he observes yt that yt Gangrene was in yt groyn, & yet yt disease appeared to have raised itself higher, for yt Inguinal gland was swelled however not aware yt yt absorption of acrid matter by yt lymphatics had occasioned yt swelling; so yt this argument proves nothing. That we should not perform amputation when a Gangrene is spreading from internal causes must be allowed but if it is spreading from an internal cause, why should we wait yt tedious separation, wt a great deal more danger than that of a recent wound. For it either occupies yt surface & yt humours passes upwards, or an irritate yt lymphatic glandr, or yt matter forms deep, & is increased by a sheath of common substance, & in both ways yt Constitution suffers more than from a recent wound, now we should prevent Gangrene by opening

happening from external accidents by an early amputation, but if ye Gangrene spreads upwards, ye amputation should in general be made in ye sound part.
The antients were very sparing of amputation because they had not thought of proper Instruments for stopping ye blood in time of ye operation, or after it; they have not continued ye Cauterie, which injudicious was only made in ye last century, & they did not know ye use of circulated needles for surrounding ye arteries, nor did they think of drawing them out, this practice was first thought of by Guido, & after ward practiced by Pare. They employed ye actual cautery, & for defects of ye small for this might do, but where ye larger are divided, it has less effect than might be imagined, ye contraction of ye artery ye clotting of ye blood, & ye swelling of ye neighbouring parts, have been all ye, availed to ye first four. Neither had it occurred to them to divide ye softer parts, so as to prevent ye returning from

having

long pyramidal, & lunar & projection of
y. bone beyond y. muscles, & of y. muscles
beyond y. skin, they scarcely cover & retain
y. flesh sufficiently from y. bone, & are to
y. present mother by cutting y. vessels surely
we are inabled not to salow, but to Chevaldon

Let us begin wt y. amputation of
y. larger & chronicles, as y. arm, y. fore arm
y. thigh, y. leg, It is evident yt y. chirurgeon
ought to endeavour to save as much as he
can of y. arm, providing y. wound be not
made in a place little disposed to heal
But where y. amputation is to be done
as y. leg, in consequence of a disease of
y. foot, in y. common management
y. patient bends y. knee, so as to rest
on y. artificial leg, & hence if y. amputa
tion is made immediately above y.
disease, near y. foot, a great part
of y. member becomes an incumbrance
standing out behind, In common
practice therefore we save no more
of y. limb than is sufficient for a
rest. But of late years several
ingenious

Some Surgeons have attempted to save even more of the superior extremity as Mr White of Manchester, who makes the amputation as low as the hand, cutting in at the wrist. But as Mr Broomfield says when cancer is cut off at the joint, the disease goes on, better, if the cartilage is cut from the neighbouring bone, we must apply the same thing to the wrist & take off the very extremity of the bone. But future experience alone can determine whether amputating at the wrist, or near it in doing the operation, higher up, be preferable.

Many attempts have been made to save as much of the lower extremity as the upper, in order to rest upon the leg. Now as yet such attempts have been made but seldom, & have not always been successful. A young Gentleman who had been, an Apprentice to Mr White had an operation done in the manner, but when he attended Lectures here, he found himself under the

y. necessity of walking in y. common man
ner by bending y. leg, & I have known both
y. Mr Hale had y. operation done was at first
but he could not bear y. walking upon it
rather than carry y. leg by bending, had it
cut off in y. common way. So in this method
we are in danger of sacrificing too much
to appearances, & y. old practice seems
preferable to this new one. We ought therefore to state y. two methods fairly to our
patient, & leave him to choose, & if he has
to gain his Bread by labour, I apprehend
y. old method will be found preferable
to this new one.

Next let us determine y. posture
of y. patient, & of y. Surgeon in time of
y. operation, & also y. Instruments we
are necessary. The superior extremity may
very well be amputated, whilst y. patient
lies in Bed, w.th y. arm laid over y. side
of y. Bed. But generally y. patient is
placed upon a low Chair. The Surgeon
is to be in the amputate the Humerus is un
der a necessity of standing upon y. outer
side

rule, but if he is to amputate the fore arm, he may take his choice but if either will answer equal, as it answers the place of cutting of two bones which are in a similar direction upwards of difference however is not very great, if we are to amputate of lower extremities, we place the patient upon a table, & for of the thigh the surgeon necessarily places himself on of outer side, but if he is to amputate of leg, he is under a necessity of placing himself between of legs to cut both bones at of same time, & to cut first of fibula before he is done w.th of tibia

The instruments he has used is called a Tourniquet for compressing of blood vessels in of time of operation, & it answers somewhat to dull of feeling of of nerves at of same time, the little attention need to be paid to this last of most common Tourniquet is made in a very simple manner, we take a roller not made very tight that of thigh of it can be altered a little, we place a piece of bladder or flannel to it, merely to keep it on, & to defend of patient skin from of rope, w.th which we are afterwards to

to

a knife it. The section must upon course of y. artery. y. course of y. humoral artery making y. inner side of y. biceps, & if we are to amputate higher than y. elbow, we place y. section of y. stump just pretty high to have sufficient room. But if y. fore arm not to close y. blood in much of y. member, we bring y. section down to next y. joint. Antient manner if we are to amputate above y. knee, we place it in y. hollow between y. tendons & above tuberosity, if below y. knee we put it between y. stem shanks. He knife with accommodate, such as window and hung w. on a piece of very strong tape to precede y. patient being knit, we apply a bit of paste board or stem, or a bit of untide upon lined w. leather. He take y. tape long enough to go twice round y. member, & to give it room for tying, & in making y. knot we are to leave no more room, than is sufficient to admit y. stick, & we make y. most simple kind of knot & in this way y. slightest touch of y. stick, we twist very strongly. Now this requires y

a violence

upon the same of another person killed in the operation, hence the place of an artery which we can more easily come at and tie upon the principle of numbing & benumming the nerve you threaten the use gradually, thereby making a sufficient pressure upon the artery (during the operation), upon the same principle Mr Hunter has contrived a Tourniquet of wood with a leather belt. It is a very convenient tourniquet, & can be made by a workman for a trifle. we have another invention of the late Mr Hunter, with an instrument made by a Surgeon in the army But I'll show you another which is better than any of these, said to be invented by Mr Lane, it takes up the vessel (double) upon an axis, & therefore with the same ease we can take twice as much) as with Petits instrument, & it grasps the membrane more, whereas the other leave an opening at the side, & the lateral branches of an artery may pour out blood in time of the operation, & by a slight touch of the screw in time of the operation, we can stop,

it.

y. bleeding anterior.

Now let us suppose such an Instrument to be just, as, & y. we are to perform y. part in y. leg, which is y. most troublesome third being two Inches. Remark y. incision w. a large knife, some have y. fancy of making it concave, meaning to take off y. leg at one stroke but this is not the way well, as one made nearly straight, as we need only to attend to the length, which when drawn to just length it ought to be enough, & a knife of 4 or 5 Inches in length will be sufficient for any case y. can occur It turns a little better round, which is somewhat crooked, & it should be quite blunt y. back not sharp like y. old ones for making use of forceps, which is done w. y. other side, & y. Surgeon not recollecting himself, is in danger of cutting himself. Now we are advised to direct y. incision, by a piece of Tape or Cloth, but I really believe this may be known altogether, as we can judge sufficiently y. place w. y. eye. This tourniquet is

is managed by one assistant on y. other
is held by another placed before it. The most common
where y. amputation is to be done, & on which
y. Surgeon lays his hand at y. upper part of
y. Joint of y. bones, & he will feel y. ligaments pretty
well, leaving a sufficient rest, & leaving
material muscles, which are employed naturally to bend y. leg, but when y. part of
bone is taken, they cease to move y. other way
It is found by experience that y. skin, drawn
back, more than y. muscles, & evidently
y. muscles draw back very considerably.
Hence Mr. Theselden has introduced a new
movement which is to be employed without
any exception; An ingenious Surgeon argues
y. in y. thigh y. rule is not necessary to
cut y. skin drawn back very considerably
than cut y. muscles & draw them
back violating y. length for y. breadth
& not considering that they are all oblique
fibres & y. skin is as apt to retract here
as in any other part, Let an assistant
draw up y. skin where y. surgeon puts
on,

on ye strait. Now must ye surgeon observe ye soft following a little but behind more than before a more strait is wanted to cover those muscles The then taken ye knife firmly in ye right hand must ye surgeon put ye knife to ye ground, endeavour to make a complete incision, but it is better to make two semicircles, one begin on ye outer side, & immediately go from ye to ye bottom, & we draw ye knife, easy to divide ye strait, & perhaps to encroach a very little on ye muscle, then we turn ye knife & finish ye circle wt great ease We have now no more use for ye strait, cou. throw it aside, & it should be taken off immediately, & if we find some parts of ye cellular substance not fully divided & yt hinder ye retraction, we divide them & desire ye assistant to pull ye strait some ly upwards. We then proceed to finish ye next incision in ye same manner, drawing ye knife ye whole way round till it rests upon ye bone. Now as there are two sections it remains ye we cut between them wt a small double edged knife. Next we

...d a little further part of ye metal that is
little separating them from ye bone, yt we may
cut ye bone as high as possible. It is not
needed to cut it away ye part where
really ye part may be very much neglected.
We are next to saw that ye bone. When you
yt saw for ye purpose, yt have no doubt that it
is one of ye best kind, because it resembles ye
most in common use wt a tenon. I have
added to ye paired by Mary a hole for putting
in two fingers but you observe yt Hook comes
in ye way wch we cannot get ye saw well
applied. How to remove this inconvenience
my Father proposed yt a piece of timber
wch should be slit, applied to ye Hook to
keep it in, but several ingenious surgeons
particularly Cooke have seen ye timber
inconvenient, we have proposed leather wch
answers very well in bone there is simple
bone. But what is still better, I have substi-
tuted metal. & we have ye hole either circular
for ye humerus, or thigh bone, or we make
it oblong to take in ye two bones of ye fore
arm or leg. & we have also a piece of
metal

mbat ye passing betwen ye bone & ye tendon
are made to move upon a hinge, & turning
begin & end upon ye principal bone, ye latter
make ye strokes short at first, till ye wound
ye saw, & get a direction streight, when we
gradually make them longer & longer. It is
ye business of ye assistant (who holds ye leg very
streight) but without either bending it backe
wards or forwards, least he catch ye teeth of
ye saw, or be in danger of crushing there
ye bones. At ye end of sawing where ye
bone seems off there is a little bit rough
Now yt I believe would do best in time of
action but if there should happen to be
(ded wt a pair of strong forceps, wt which they
can take off any sharp point, thereby pre
vented ye amputation, we next tie ye bloodvessels
& ye more exactly we surround ye artery, so
much ye better. We pass ye thread but once
twisting ye knot almost close, we pull
in ye thread wt ye thumb, least it slip
over ye orifice & open ye artery, then (draw
ing it tite) we desire ye Tourniequet to be
slackened, to see that we have (drawn

it

it w^ch force enough to stop, & turning, & to carry
y^e first hook we make a second & so on, & with
w^ch common pair of Skissars, we shall cut y^e
y^e edge of y^e wound, but so long y^t we can after
wards easily spread them & take them away, w^ch
should be done at y^e first dressing, least they
come to be buried in y^e flesh, & there is no
way of taking them out then; y^e dressing
being to be made generally till y^e end of y^e 5^th
or 6^th day. Tho this is y^e most common
practice, but it is beyond a doubt y^t we can
tie up an artery in a much more simple
way, by drawing it out w^t a pair of Scissors
like Forceps, or w^t a common hook, such as
Chesselden has long ago represented, & by
this means we avoid wounding y^e flesh
& avoid including y^e accompanying nerve
But supposed y^t the artery can neither be
drawn out, nor laid hold of by y^e needle from
y^e particular situation of y^e artery, or where
y^e flesh is very rotten, we have recourse
to Astringents, & to Compression, but we
chiefly trust to y^e Compress, for Astrin-
gents approach to y^e nature of Caustics

&

& what yt. man [illegible] we would [illegible]
ne or Spunge, as I shall explain afterwards
how what I shall proposed in all yt. is mans yt
in accommon amputation, viz. Sharp hath
noticed yt. we should pass a Ligature
needle wt a thick cord thro yt. skin at some
distance from yt edge of yt. wound, & draw
down yt. skin mechanically. but if yt. usual
manner I have mentioned be attended to
this will not be necessary, & it must occa
sion a neat cicatrix of yt. part.

Suppose neglect in collecting & Cure
in consequence of this occasioned in yt. head
of yt. thigh bone or humerus, that yt. joint
is spoiled, it shall been proposed to take off
yt. whole limb at yt. articulation, & in
superior extremity, yt. operation has been
done several times, & how in such cases
we would prosecute Bilgard mentioned
in Mr Wiltes Book, we have a most
excellent example, & shewing yt. possibility
of saving yt. limb, by not only making
an incision of yt. outer part, but cutting
out yt. head of yt. Bone, & where in a com

pound

and cartilage not any of which were divided, but
the motion of the joint restored. There was then
a pain in the pit of the stomach, with a little
nausea and incision, pushed it out, & that no
particular pain was taken to retain it more
but, yet the motion of the joint was perfectly re-
stored, cartilages & even membranes
seem to have formed.

I shall show not only the way of imitating
Nature's operation, but of doing the amputation
where it is necessary in the most extraordinary
in a way more simple than that practised
by Mr. Hunter, I begin where I am determined
to amputate, but being willing to avoid
the bleeding necessarily, by making an incision
between the pectoral muscle, & cephalic vein
down in the armpit, & then shall carry
on the knife the length of the large incision, to the
head in view, & having divided the skin
sufficiently, I next take a very large needle
& take up the whole vessels & nerves
I do not like them but have in a certain
way of preventing a great loss of blood, as
I can pull it when I please. I next make
my

my [illegible] which I began y. operation in case y. skin here, was y. former operation, which is im- ply by y. assistant, & was finish y. incision y. skin, before we make any incision y. mus- cles. Nept would cut y. muscles as y. other side, if we had meant to save y. limb. Sharp leads his men into difficulty, from y. idea y. we can't dissect y. bone sufficiently whereas there is nothing carried. He next divid y. Capsular ligament w.t y. Bursa mucosa over it, & on case of cancer, we cannot save y. end of y. bone, nay we can't even y. head of y. scapula w.t a sharp pointed instrument, without carrying any material blood in y. socket. But suppose nept y. skin to divide y. larger blood vessels, & then an assistant ready w.t a tourniquet compress them y. first rib, & then nept to divide y. large muscles. Then having finished y. amputa- tion & removed y. arm, take hold of y. ends of y. arteries, and if not to tie it but suppose he could not be able to collect

I have my Lopalum, wch I leave it till ye
first dressing, yn I may clap ye bleeding w. abso-
lute certainty.

As for ye operation on ye top of ye Thigh, wch
by cutting off ye end of ye bone it is termed ye 4th
but I would not chuse to engage in it. Ye qtie y
matter affords (making) ye may turn out ye
end of ye bone & cut it off, according to ye me-
thod proposed by Wiseman. There are ye common methods
But another method has also been practiced, y
of making flaps, i.e. covering ye stump w.
flesh. Thus if we want to cut off Thigh bone in
ye middle, it is proposed to take a long thread
& to shape ye flaps w. one eye, first ends then
thro on ye inner side, then we cut ye remai-
ning flesh w. any common knife, & turning
tied up w. velvets, we endeavour to make
ye two flaps light to one another, but ye
objections to this method are that ye liga-
ture between ye flaps, & if a fever not well
treated out, we get at it w. difficulty
Now ye great surface there is an immense
unless ye two sides agree together, tho
later writers have proposed an improv-
ment

ment, (thalamus), when it is needfull to take into. He proposes that we should not make such large flaps, but rather to make them on ye fore & back part, then we are not to join them till ye suppuration begun on ye 10th or 12 days, when we unite them w^t equal certainty & w^t greater safety. But if ye common operation is done properly, ye use of flaps is very unnecessary, especially as ye body is not supported on ye stump, but rather on ye side.

It remains to mention ye Amputation of ye smaller extremities. Surgeons formerly attempted to amputate them w^t ye dexterity & celerity that, burning as well as cutting, do an operation on ye fingers, as on ye larger members, we draw back ye skin after cutting it w^t a concave edged knife, & saw ye middle of ye bone descending ye other fingers. As we take ye fingers off at ye joint w^t ye same knife, & are directed into it w^t ye nail of ye finger & thumb, we take off ye cartilage on ye end of ye bone, & we may make two flaps. Suppose ye Metacarpal

humal, or Metacarpal bones (discovered separate from them, Surgeons frequently in this case take off the whole hand. Now I have seen an operation by Mr. Adie on y^e^ foot, where was a very wide space covering y^e^ fore part of it & he still between, y^e^ great Toe & one next to it, & he took out 3 toes w^th^ all y^e^ metatarsal bones. The void was filled up & healed completely, he had a cushion made to fill it up & he walked w^th^out any distinguishable halt But even this may be unnecessarily severe. If y^e^ Metacarpal bone be discovered, we may take it out, or we may cut it thus w^th^ a Scalpan, & take out y^e^ part of y^e^ discovered & y^e^ void may be filled up w^th^ an artificial substance, or so Quick as to answer y^e^ purpose of bone, & in time needless to take them up in hand of Surgeries bleed much.

I have now endeavoured to explain all y^e^ operations in Surgery y^t^ require particular caution, & y^e^ head and neck (dewlap) & y^e^ analogous of y^e^ parts at y^e^ groin, you will find little difficulty in adapting them to any part y^t^ may occur

Yours

We now proceed to consider ye proper treatment of Wounds after ye several specialties, & beside ye thro ye remaining two sorts of Wounds viz. The management or method of healing or securing Divided, as Vomica Incisions fractures, Burns in general; Bibulus Divisions of ye limbs by different machines. But shall first make a few general remarks when ye Termination of Inflam: & ye nat: Surgeon how in treating it. Have formerly considered ye cause of Inflammation & have now to attend only to ye evident circumstances If an Inflammation does not still proceed either from interrupting ye function of an Organ material to life or by a certain effect of ye V. A. & is not Discussed Resolution, or mortifies or there succeeds to ye Inflammation a hardness called Schirrus. The Surgeon endeavours to Discuss by lessening ye general impetus & he does most effectually by drawing off from ye Circulating mass, for in ye arm ye pulse of ye blood is diminished one

beyond

beyond what we can explain on mechanical prin-
ciples, because of diminution of y. motion
&c. of imitation upon y. heart & evacuation
of y. heart & vessels &c. The diminution
moves to dilute y. blood by giving dilucula,
to evacuate that y. other excretions of y. body
& purgatives have a remarkable effect, for while
they operate like W. S. in a certain degree, they
likewise draw y. humours from y. inflamed
part, to which they are particularly determined
We likewise give acid & accescent substances
which take off y. general tension, & lessen
y. irritability of y. System. In y. plant we
we apply such substances as attenuate to
yield readily to y. stretching, as water &
substances in general que relinquish tension
& by loosening y. minutest vessels to diverge
But besides merely relaxing by watery
fluids, or steams of different humours we
sometimes venture to apply substances
w. an excellent effect, which seem to be
directly opposite to y. nature of y. water, as
y. solution of Saccharum Saturni, acido
Saturn spirits, which are found to be
powerful

proper (diseases, because what shortens per-
spiration, they dispose y. sensibility of y. nerves.
Next let us observe what natural powers in suppu-
ration, y. we may be able to counteract that in
wounded cases, or to promote it in others, & to un-
derstand this process, you must consider y.
appearances which take place in y. first
part, y. discharging orifice of y. vessels, y. quan-
tity (distension of y. vessels) interrupt in
y. part, where often takes place y. next step,
viz. by Adhesion. Here accumulat y. serum
into an effusion of fluids, which are generally
coagulable, but if y. inflammation is violent
y. red particles of y. blood may be intermixed
The effused humours change their appearance
by stagnation, they appear very different
from y. mass circulating, instead of being
liquid, we find what we call purulent
matter, in which we distinguish globules,
this may depend upon a degraded alteration
which y. parts have suffered in preparing
from y. circulating mass by y. retained
substances, for if a wound is moist, we
(do not find y. purulent matter till after a
certain

certain time & that in such a certain state to perform its office & stand & there is a real change made on the humours in passing thro the vessels. But there is another change which depends upon coagulation absorption & the consequences of that. That is sanguine part of our blood by being at rest loses its circulation, & somewhat by its heat & fluidity, puts on an appearance very like to that which does not' doubt is produced in perpetuating passion, which we may compare to the fermentation of fluids. Apprehend that there is a degree of fermentation in every humour which from being in an uniform state terminates in suppuration. The fluids and thus not only altered in their appearance & properties, but the solids are melted down, & when the matter has remained for a considerable length of time every part comes to be destroyed by it, & it seeks its way outwards where the resistance is least. Now if we admit this notion of suppuration, we must endeavour to discuss by drawing off from

from y. general nerfe, but y. are more especially
to be wated during the purging time
we would advise the taking some
stimulation which promotes y. effusion, and
we would apply a cataplasme of y. meal
flour, we would also y. the perspiration, and
y. same time invite y. peal, we by
various cataplasmes which are by purging
in y. natural warmth promote y. peal
and suppose y. y. inflammation goes be-
yond y. bounds of suppuration, y. in despair
to exc in mortification, some have thought
that y. more bituminous y. medicate
in some effects tendeth y. to mortification
Tho this will more rarely have y. effect
but it is not impossible some, the in
flammation there is often suppuration
y. red parts without mortification, may
perhaps there may be an effusion of the
serum of peal where there is no Inflam.
y. blood coagulum, serum and part
such a purulent or dangerous symptom
in mortification, there is an effusion
of a red colour water, but that is not
y.

y[illegible] but rather y[illegible] y[illegible] y[illegible]
y[illegible] y[illegible] that y[illegible]
y[illegible] y[illegible] y[illegible] y[illegible]
y[illegible] y[illegible] y[illegible] y[illegible]
y[illegible] y[illegible] y[illegible]

is allowed to be hurtful. I think this precaution should be avoided in y^e^ situation, & upon y^e^ same principles, I would likewise reject y^e^ practice recommended by Bontekoe, who in a heart that has mortified on y^e^ surface, cutting down thro' y^e^ Eschar into y^e^ living part, that blood is discharged. For telling blood is more here to be hurtful, & by our incision we excite y^e^ irritation & inflammation in y^e^ part & inoculate on y^e^ part deeper w^t^ y^e^ matter that is already in a very corrupted state so y^t^ rule should be taken freely, y^e^ effects there are manifestly good, taking out y^e^ corrupted substance, which from being absorbed or applied to y^e^ nerves, might have a dangerous effect, for we find y^e^ glandular swell between y^e^ part & y^e^ heart, y^e^ consistency of y^e^ liquor, not preventing its absorption, then by cutting y^e^ Eschar we lessen y^e^ adhesion of stagnant it shrinks on being exposed to y^e^ air & is more readily thrown off, & by using saline & aromatic resinous substances we either correct y^e^ acrimony of y^e^ matter

or

have y. vessels, so that they do not so readily
receive it. I need say nothing y. young y. earlier
precisely, which [illegible] infinite experience
once observed to be so expressive power in
preventing & in curing mortification; so to
y. remaining termination of Inflammation, there
is here so much Circulation as prevents y.
mortification so continues light yet y. Circ-
ulation goes on (difficultly from y. quantity
of matter effused in y. Interstices which
gives y. hardness, while y. parts of y. vessels
solids and fibrous changed in their texture
Now we find y. Inflammation proceed Insensibly
but in many cases we find it y. cause
of y. Inflam.n forming slowly, & afterwards
producing irritation & consequent Inflam.n
Yet suppose y. there is a wound
this necessarily produces inflammation
with consequence; we can't here escape
y. Inflammation, which y. wound occa
sions, without its coming to a suppuration
because y. wound never can an irritation
to y. nerves, & by y. number of y. vessels
which are (divided, there is a consid.ble
effusion

ffusion of matter about the part or
organ in which the disease seems to
abscess or suppuration follows and
the chief business of the surgeon then
is to regulate it's progress. The
Inflammation may be frequent, if it
announce the remedies, then if Hyperca-
thartics, venesection, where more
are needed, no person of moderation,
cures by applying emollient substances

He must proceed to different Instru-
ments which surgeons employ, & 5ly
The surgeon before he can apply a ban-
dage must recollect a question should
you if wounds or ways by which parts
some purposes where different proce-
ed by an Inflammation is confined
within an abscess or exfoliation, the sur-
geon may be under different circum-
stances & keeping them distinct by a
critical history of disease by which may be formed a prudent or
why most salutary just into a but-

of rag, or in some few cases, we employ metal or wood, or it may be necessary that ye substance proper to ye power of swelling in order to dilate ye opening, as where a fistulous sore requires a deep abscess, allowed ye orifice to contract, will not suffer ye Surgeon to make a proper incision, or that this is unsafe, he makes a dilatation by using a bit of sponge. To make it proper less bulk, he dips it in any tough substance, as fish glue, or melted plaister & ties a thread about it till it is dry, & pulls out ye from this dilate powerfully, swelling out afterwards, but we employ at first a very small Tent, for ye swelling is so considerable as to excite exquisite pain, so we increase ye size of ye tent in ye most gradual manner. In some cases a double is used, which may be called by ye same name, but which is called a Defoil. It is made of Tow a little long, & we lay it in w^t ye view of preserving open, or dilating any cavity, as in opening ye lachrymal Sacks, & we tie a bit of thread to ye Defoil yt we may easily get it out

Next

Sept we use Compresses, & a Bandage
when ye Bandage is laid on, it may press
strongly on a particular part, as in ye case of
an abscess in ye thigh running downwards
if ye Surgeon cannot get to ye bottom of it, he
cures it by squeezing ye sides together, in
order to hinder ye matter from collecting
more low, and, as common sense, where
ever he has no Sinuses to pass in.

After have performed preparations, we
come to dressings, & use either ye common
sort & sticking plaister, using sometimes
Surgeons more: sometimes ointments & liquors
liquors to their dressings, framing them into
an oval, as by turning ye sides a little, for
it lies unequally on ye part. For most part
loose ye Unguent is sufficient, it posses in
all ye qualities ye are necessary for ye cure
of recent wounds, it keeps up a sufficient
warmth, keeps out ye air, sucks in ye
unnecessary moisture of ye blood, leaving
ye thicker parts in which ye new vessels
shoot, for ye suppuration of a wound is
not merely a matter happening from
accidentally

neceſsity, but experience shews that if much is
is of most powerful assistance, for in it alone it
formed for the tender respects, vein, of the
cavities, there is first a (diachang) ſtyptic
tion that gradually acquires a greater consis
tence, & soon afterwards there is an elonga
tion of respect within it, so it prepares all
if properties necessary to promote healing
perhaps there are not many cases, where
Surgeons do as much as they often imagine
where a change is necessary in if healing
a wound, we make it chiefly by internal
medicines, giving if Mantle in, (diachalon
to a proper (diet & regimen, some apply if
dressings to if wound in if most simple
manner, shaped according to if size & shape
of if member, after covering if wound with
dressings, in some cases we assist Mantle
(dages with plaster, as after if operation
for if Hare lip.

Now suppose that if dressings are
applied, & that we are to secure them by Man
dages, we find these of various materials
of linnen, flannel, or cotton, which is a
medium

medium width & also two inches respect to warmth & elasticity, & in certain cases we join leather included. But commonly we employ y^e linnen because we procure it more easily, can shape it more exactly to y^e part, & it sticks not by any thing linnen. If we tear it into one shape, whether it can have it two, we call it a single Bandage when one or two heads, but if they are in different directions, they are called Compound Bandages. To the due applying y^e Bandage, we put it into a hand shape, & if it is not broader than y^e length of one finger, y^e Surgeon can roll it himself, putting y^e shape over y^e fore finger. But if y^e Bandage is broad, we take y^e help of an assistant whose business it is to stretch it, & to draw away any loose threads as they happ.

The methods of applying y^e Bandages are very few, & there is no necessity for any using technical terms to express them. I can make circular, or descending or ascending by degrees, make spiral turns, or I can leave spaces between these turns or I can remove y^e Bandage, if it is not

plied

plied to a member of a Compact shape, & Band it in
your hand, I twist y. bandage & draw y. thread
tight by turning y. roller, Now where I must
this turn I have necessarily a great deal of
pressure on, & avoid y. ridges of bones, or y.
power of y. subcutaneous vessels. On pulling
on y. Bandage, we make it a rule to keep
y. Ball outermost, whereby it is less in dan
ger of slipping from y. hand, & on in ma
king y. reverse turn, I get y. bandage in
a more difficult way, I continue to make a
second, tho' not otherwise altogether necessa
ry. In taking off y. Bandage, I roll y. re
verse on y. roller, keeping it now in mo
tion, as in this way I collect it more
easily & conveniently, & y. turns I make
w.t a single headed roller, it is evident
y.t I can make w.t a double headed one
but as it employs both y. hands, we
avoid it as much as possible, & where
y. Bandages are long. y. two heads are
apt to entangle one another. The one
other rule is, before you attempt to dress
any wound, you ought to have ready every

thing

thing that is necessary, & you may apply the Dressings as quickly as possible. For keeping the wound from the air is very material, & to say wt Sharp y. wounds in Battle cure, that process owed to y. air, merely arguing that healthy Constitutions will get y. better of every difficulty for when y. Constitution is broken & y. wound dangerous, y. air adds to y. danger If y. Dressings adhere, & a plaistery substance have been employed, we may soften them wt oil, or wet y. Bandage.

We now examine y. different manner of Bandage, beginning wt those of y. head.

The Common chief. To make it we take a Kerchief about a yard every way; we double it but not equally, leaving one hand end the longer than y. other, we then fold it square to get y. middle of y. Bandage, & apply it some wet one hand, but we doe it better wt both. It is large enough to cover y. whole head, & in y. colder climates it is often used, it is double, & I mean to turn back y. innermost part, as I give y. outer part to y. patient or an apothecary

then

that I pull y. corner of bandage, till I find it meets
lance, then drawing it tight. I turn it back,
folding it neatly, so as under & in, a slight
one lie them, but it is better to cross & pin
them, & remove to fit y. shape of the corner
which is to lay at back under y. chin. We
then have a very equal covering for y. whole head
which we can readily rest, if req.d, & it is
used after y. surgeon's &c. But in y. event
neither of the years in this Island we may
make it of a thin rag or we may use the
Handkerchief, folding it diagonally
placing it again to find y. middle, we then
lay it over y. head, bringing it down to y.
eyebrows, & bringing y. tails round y. head
round back, we tie or pin them before, first
y. other end at pin, & adding straps to tie
beneath y. chin, we give nearly y. same
security, as w.t y. former Bandage.

Galen long ago two given a Ban
dage of y. Tails, which many of y. mo
dern employ. It is laid over y. head
& beginning at y. back part tails, I make
a circular round y. head & pin them

Next

Next passing the fore part of the Bandage, so as it may not appear, & double the last above the eye, & bringing it to the nose of the neck, thus pin them. Then to cover the former turns & to give a sufficient security fix the middle two tails under the chin.

A Gentleman who attended Lectures here with me his Night last passed the passing of all these Bandages, & it is by me a contemptible one.

But some not content with these, have proposed the making a Bandage with four ends in the passing for the Hydrocephalus, in order to give a certain degree of firmness to the bones of the head. We turn one part of the Bandage backwards & forwards, which with the other we make circulars, so have it in our power to cover the whole head. But Note upon this as in many more, it is troublesome in applying, apt to slip in taking off, & it is less secure than the former bandage, & as to compression by the former we can make that sufficiently. We might give this further security by

by crossing a thread over y.e head, & joining each 49
turn to it &c.

If y.e for particular parts of y.e head, as turns
of the Uniting Bandage as for a cut in y.e
fore head, for drawing y.e sides of it together. We
take a double headed roller, make a slit in
y.e Bandage, & place one of y.e heads that it, where
by we can draw it very close, & we can repeat
this turn making a second slit. Now this con
trivance will apply to any other part of y.e body
as a longitudinal wound of y.e arm &c. An
ingenious Physician in Dublin has made an
improvement upon this Bandage, instead
of one slit in y.e middle, he joins y.e two sides
by a number of threads, made to cross each
other, whereby y.e lips are pressed down in
a more equable manner. Hence even some
have attempted y.e cure of y.e Haemorrhagy w.th
this Bandage, tho' if I were to go to work
without trials, I would prefer y.e plaster to
y.e Bandage).

If y.e wound we are to put a dressing
ing on any particular spot, as after opening
y.e frontal vein, I would place a part of y.e Ban
dage

(page

(bage) as long as to reach to y. nape of y. neck, & an
assistant holds it, till y. Surgeon makes ye (new
bar), then a pin is put in beneath to hold it,
& repeats ye same more circulars in order to fix
it. This is called y. Division. Manner of
turning y. shape over y. head, by turning it
side ways, we would have given it a neater
appearance, laying it obliquely along y. fore
dal bone, suppose I make my circulars
as before, in order to fix y. Bandage, & having
done that, procure y. shape put over y. pa
rietal bone, by which y. crown of y. head ap
pears in y. shape of a Boat; & we call this
Bandage Scaphia, it looks neater than y. for
mer.

Nay I suppose a Surgeon wounds, but
an artery springs in y. head, suppose in
y. Temples, y. he have let blood in y. Tem
poral artery, & have not provided wt a machine
but obliged to cure by a bandage, I begin
on y. opposite side, lay on a pro. hen. compress
then twist my Bandage, carrying & turn
ing it at y. same time upon y. wound
& by repeating these turns, I can make a

very

very strong compression, inducing one part to another till sufficient compression upon ye wound of ye artery. But not suppose that ye wound is closed or that ye Surgeon have extirpated ye parotid gland we cannot here form ye Case, which would be cured ye sooner, so we form a part, twist & make ye under ligature, ye superficial wept, & give ye Bandage full security, twist & bring it to ye place of ye neck, so sufficient ligature, what was ye superficial back again, removed it whilst ye other is brought to ye opposite side w.t out twisting on ye side, come to ye side where ye wound is, & dispose them part as pleasure.

The next Bandages proposed are for ye Eye, that part of ye cheek hang (down; & so can go round ye head w.t edgings, covering ye eye, or Eyes at pleasure, making ye edgings, ascending or descending, & so lie them all down w.t a few circulars, such have been named. Monocular & Binocular. And every purpose of such is answered by ye most common way of placing ye Handkerchief slanting —

Where

When an application is to be made to ye neck, or more convenience may be necessary, for as to ye Cranium, ye Bandages would rather profit ye Chirurgeon as we may have a small Bandage round ye head then having applied a pultice or emplaister, or bring another sharp over ye head, cutting hair & ye wound which ye patient can breath, & ye Bandage have been, name accipiter, resembling ye head of a Hawke.

Wee suppose that ye most Bandages for ye lower jaw, are here proposed called ye Capistrum or Halter, we begin w^t a single or double headed roller, which here is preferable, make a number of Edgings upon ye Jaw, bring ye bandage forwards, & after having made several turns in ye manner as ye jaw w^t Edgings, then to ye nape of ye neck, make several turns of ye kind, finish ye Bandage by bringing a few remaining turns over ye chin, by which ye jaw a neatness & firmness to ye whole. Now this is proposed in fractures of ye lower jaw, but for applying Dressings after an operation here we use what is called ye sling, or

4

Tailed Bandage, making a small hole for ye
string in ye Chin, we begin w.t ye uncut
straps, which we cross at ye top of ye head, then
we cross ye two upper in ye nape of ye neck
then to ye top of ye head & join them. ¶

Sometimes ye tongue is wounded, & a
method is proposed in ye Memoirs of ye French
Academy, a purse is introduced w.t in ye mouth
by means of two wires, which you secure by
a Bandage round ye nape of ye neck. ¶

Wh.t supposes after ye small pox, or
by any burning of ye skin of ye face, as by Gun
powder, y.t we need to cover it, we (so that
by leaving proper holes for ye Breathing &c.
beginning w.t ye uppermost or undermost
tails, & finishing w.t ye middle straps we tie
or pin.

To ye neck four Bandages can be applied
in some cases we use a Strap over ye head
fabricular or two are contentive, or if
ye neck is not very long, ye Bandage
supports itself. Wh.t supposes if ye
skin of ye neck, or Sterno mastoid mus-
cle has been cut, we place ye head
straight

straight after ye operation, & wt a double headed
roller, we prevent ye head & arms falling
we give ye same security by joining a Sight bas
shape to ye Cloths between ye shoulders.

To ye Trunk of ye Body a great number
of Bandages have been applied, & you will see
a great deal wrote upon them in Bowles, but
we may reduce them to great simplicity, observing
that ye arms & legs are joined to ye Trunk so
nearly in ye same manner, yt we may call
ye upper & inferior extremities together.

We can make a figure 8 right upon ye
shoulders, & can repeat ye turns as often as we
please, or we can make this figure upon
ye Breast, or back only, or we do ye same
thing on ye pelvis, passing round ye body &
ye Thigh, or we can make ye same figure
wt reguge, ascending or descending on ye
shoulder &c, & on ye Bandage now round
lev an ear of Barley, it is called Spica, &
what we do more slowly wt a single hea
ded roller, we do quickly wt a double hea
ded. Next I can reverse a Bandage, very
like ye Bandage I showed in ye Head wt

is called Capelline. Roll Circulars my. Trunk
w^t a double headed roller, w^t one hand I make
constantly Circulars, whilst w^t y^e other I make
reverses, giving y^e first turn w^t a pin, then I
bring y^e one hand over y^e shoulder, & w^t y^e Circular
I tie down y^e Bandage, w^t which I make y^e reverse
&c. I can make these either continually in
y^e same place, or I can make them w^t edgings
& I can in this way cover y^e whole shoulder
were to make a Compression about y^e top of y^e
shoulder or any particular part. And y^e very
same thing can be done at y^e bottom of y^e Trunk.
I can make one roller describe Circulars round
y^e Body, whilst y^e other roller passes between
y^e Legs. I have in some cases of violent bleeding
where operations are done on y^e Perinæum
Heister has recommended such a Bandage
but y^e place of it is much better supplied
w^t a Tourniquet, such as I showed you
at y^e last, confining it w^t Circulars.

Lect. IIIth

I showed you y^e method of making Circular
or reverse turns, or of applying a Capelline to

to ye upper or under part of ye Trunk. But it is
to be observed yt such bandages ought to be avoided
as much as possible, because of ye trouble of putting
them on, especially using ye double headed roller.
Kept in ye time of putting them on, especially
using ye double headed roller ye body of ye patient
must be exposed, which lay in treating cases of
importance, he may suffer greatly, & tardly they
prove galling & uneasy, especially where they
pass under ye arm, in ye axilla, or between ye
legs, yt we need compunction to desire ye parts
we ought only to use them where a particular
pressure is required. In different parts, (wch
may occure, as in ye fracture of ye collar
bone, or in ye luxation of ye humerus, where
such an application may be necessary, but
for wounds &c, we would prefer to them
more simple Bandages, & these upon ye
whole are of 3 kinds.

1 The String, it is made wt ye tailor
in 2 can apply it either straight around ye
Body, or if ye Pain treating a Division in
ye Breast, I begin wt two ends under
ye Breast, & by turning up ye others over

ye

y. shoulders, so called Scapulary. The napkin is
made long enough to go round y. body & to pre-
vent it from slipping, we lay straps over y.
shoulders, so called scapulary. The Scapulary is
slit, & put over y. head, as we have a two tailed
Bandage, entire behind, & we may put it now
it to y. napkin, or we may cross them before
which makes a more equal support. Now
I may use a Napkin & Scapulary at y. under
part of y. Belly, but as y. Bandage is in
danger of slipping upwards, we bring straps
round y. thighs, not between them y. y.
patient to may pass water; or go to stool. If
y. napkin is too warm, we use a single
roller, which may go round once or twice
especially if y. ribs are fractured, to put y. pa-
tient under some necessity of breathing w.
y. Diaphragm; & we may use y. flannel
on account of its greater elasticity.

There is one other Bandage which
is very convenient, & much in use, y. T
Bandage, so if we are to treat y. breast
I make y. tails so as to go round & come for-
wards again, & having applied y. dressings
we

we tie y. other ends round y. neck & shoulders
& it is an excellent contention, & if y. disease
is in y. axilla, there is no better bandage for
keeping on a poultice; we bring up y. one part
crossing over y. same shoulder, & bringing it
round under y. other axilla we tie it. But this
bandage from custom is almost only applied
to y. lower parts of y. body, round y. pelvis
& there we can put it on in a variety of ways
If we are to treat a sore or abscess behind
about y. sacrum or Os coccygis. Slit y. Cir-
cular w.t a pin, then applying my dressings
& bringing down over my Table, I secure them
joining them to y. Circular. Same here pro-
posed in cases of this sort, y.t we might
have y. Circular tied by a number of
pieces of tape tying to y. perpendicular of
y. other thigh, so y.t when we want
to dress y. sore, we have only to loose on
y. tapes. But this addition is scarcely
worth y. making. Instead of a piece of
cloth slit in a certain way, we may have
y. one thigh slit y. whole way, & w.t
this we can contain dressings of various
kinds

hinder, can' not it as a suspensory for y. Scrotum &c. y. common manner is to put it behind, & to tie it before, but it is better to reverse this cutting a hole for y. penis, & being thus firmly rewed to y. Circular before I adapt it more accurately, & then in pulling on y. Circular we should remember to apply it over y. bones of y. pelvis, where y. Taylor lays y. head of y. Bandage. The use of this Bandage is manifold, as we should study to put it on neatly. It may be applied after a number of Capital operations, particularly in abscesses about y. Os sacrum or Coccyx, after y. operation for y. fistula in ano, in Lithotomy y. Hydrocele, y. operation for Hernia, in treating Buboes, & we fill y. vacuities by soft Compresses, where ever they are found to be necessary. For merely suspending y. Scrotum, & applying a poultice, as in y. case of swelling of y. Testicle, we have a particular bandage. A Circular is put on which is made to fit y. patient, & to this we join a sort of pouch, for containing y. Scrotum, by means of Button

&

extraspo, we can either cross ye thighs, or leave them w'out crossing, & we bring ye thighs more ye thigh on either side, & thid may be more easy even when on leave back w'out much inconvenience. To ye same purpose, we may adapt a longer bag, in cases of Hernia, a Bag large enough for putting up an artificial anus, it is made of flannel. One more machine may be mentioned, sometimes an artificial anus just b. ye bunch behind in case, as in ye case of paralytic weakness, when ye muscles of ye bowels is compressed, & if there is an ulcer or Inflammation of any kind about ye spinal processes, or muscles of ye back, when ye patient can't sit up on bowel w'out great uneasiness, he may obtain considerable relief by wearing a pair of stays only we take care to make a large hole at ye place which is swelled, that we may throw ye support on ye neighbouring parts.

Nothing is more easy than to apply Bandages to ye extremities, ye shape of ye extremity favours ye turns of Bandages very much, & there are but few that is need

need to be particular in Naming. Suppose that we are to let blood at y^e^ arm after doing y^e^ operation; we apply a Bandage long enough to make 3 or 4 turns of a figure of 8 at y^e^ elbow there is as much as is necessary, & y^e^ bandage need not be thread. If y^e^ vein is in a hollow we put a little bit neat y^e^ orifice then a bit of sticking plaister, then we fill y^e^ hollow w^th^ a small compress about the figure, the misse y^e^ orifice, lay y^e^ sides of y^e^ wound together & put y^e^ arm in y^e^ position in which it is to remain, some shave to bleed well as to join, but y^e^ joining is sufficient. But suppose we prefer y^e^ tying, we unroll a little of y^e^ Bandage, & begin to describe y^e^ figure of 8, & apply it light, & y^e^ way a thread ought to be, w^th^ y^e^ vein, of making compression either over y^e^ compress or under y^e^ orifice, Now we cannot do it over y^e^ compress, so we ought to throw it in under y^e^ orifice upon y^e^ vein, & we ought to twist y^e^ cord a little to have y^e^ effect of pressure.

Now y^e^ same turns serve for containing the springs, after y^e^ operation & y^e^

of. Incunions, only they ought to be applied dilt.
ly.

Sept. misplaced of. hand & fingers to be divided
ed of. shape give an opportunity of sipping of. han.
dage, & giving of. appearance of evil. Affectuating
circular or two around of. wrist, as generally
on of. back of of. Metacarpus & upon end of fingers
as we can press down by degrees, respecting of.
bones as pleasure. But such bones can
only be necessary where of. principal pleno
on of. back of of. hand, for where of. fingers
are bound &c., of. surrounding of. bandage thus
between of. fingers gives pain, so we would
slip bits of old rag between of. fingers, &
cover all w.th a proper practice, a piece of
old rag. The same kind of bandage apply
to of. foot, & of. same kind of observations
apply w.th respect to them.

We now proceed to consider particular disor
ders, & we shall begin w.th

Hernia. Suppurations. Wounds

misplaced a Hernia or Protrusion of. viscus
& of. posture w.th medicines have not had
a sufficient effect, but a mechanical sup
port

part is necessary, some Surgeons prefer to use two Balls of Cork, which are introduced with y^e Vagina w^t a proper spring, but y^e former is found to be more convenient, particularly that which moves round in a socket, or the introducing a ring of Ivory, which answers very well.

Tho' suppose a Reprise of y^e other Bowels shou'd formerly mentioned y^e several methods of reducing them, by pressure, posture, or agitation of y^e body. If these do not succeed & there are no symptoms of strangulated viscera & if y^e Bowels are in y^e sack, we employ only y^e Bag-truss, but if they are reduced, to prevent their falling out again, we employ compound bandages, & y^e common material to have, not sufficient Firmness, if y^e Hernia is umbilical, a Circular is put round y^e body, y^e patient is laid in bed upon his back, w^t his shoulders raised a little, more to relax y^e parts. The Surgeon reduces y^e bowels, & y^e moment they go back, he lays on y^e Cushion of y^e Instrument, then tightens it sufficiently

&

y. patient ought to keep in his bowels a little
clear if no light can be found, or spring towards
that when he inspires it may give way a
little, & scapulary should be found to it &
moreright have shape likewise) around y.
thighs. To keep up y. prominent in all violent
expirations we may use a spiral spring
made so as to be drawn out by y. dilatation

Suspend upon y. Hernia below, we make
cushions sufficient to fill y. bowels at ye
outer shape all of leather, with a considerable
strength of spring. The cushion is made
of cork covered with leather, or it may be
made of ivory, for if it is too soft, a little
bit of board got out, between y. ring &
spring. Even when we observe y. part
hath got out, we slacken y. bandage
& putting y. patient into y. proper posture
we replace it, & again affix y. bandage
y. Hernia is on both sides, we must
have two cushions. In using Bassema
stories, y. measure of y. patient ought
to be taken in y. most accurate manner

Poor

(heri people) may supply the place of this Bandage)
by covering a lil of wood w^t Tow, & over all
leather, & securing this w^t a thread, or w^t y^e
head band of y^e Bandage, For Children too
have Bandages are to frim & especially
ye fracture may be made of wood, & covered
w^t cotton, & suspended by a circular pad round
y^e pelvis, & a thread round y^e top of y^e thigh.

Meaghil Titanus to be provided w^t
machine for y^e fracture cruris, as a circular
round y^e body, w^t a spring of elastic metal
covered w^t a cushion, & made narrow to
fit y^e one of y^e rectum exactly.

Next let us consider y^e Luxation
of y^e different joints, & how we observe y^t
that from y^e primary & imediate, nature
doun ligaments, & strengthen from removal
dislocations & luxated bones, it is hoped
doubt y^t y^e capsular ligaments are not
toughened out, but in ye knees of 20 at
least and tore. Now this being admitted
y^e obstacles to y^e reduction are twof
y^e rent in y^e ligaments, y^t the Surgeon
may not bring y^e head of y^e bone back

to

to ye place, in ye very same direction in which it came out, that ye head of ye bone may not enter ye laceration of ye ligament, but that is not ye only principal cause of ye difficulty for ye most is generally very considerable & ye remaining parts of ye ligament, give ye bone nearly ye true direction, but still in particular cases this may be a principal obstacle.

Next consider ye shape of ye bones themselves, yt ye ends of all bones are larger than their middle or waste, so that ye ball is called by ye edge of ye socket

Next in order to render our motions more expensive & sudden, ye tendons of our muscles are generally implanted in ye heads of bones, near to their extremities where they act wt greater advantage, & when a bone is displaced, ye muscles or tendons considered merely as cords are thrown across it, so as to prevent ye head from getting back cavity, & must consider next our muscles as sensible substances, which when irritated inflame, & thereby grow shorter & stronger

&

§. humours are retunded by contracted vibratory
ces, which thos are (quiet & regulate in a sound
state), yet when irritated they act contrary
to our will, by an inherent of nature §. mus
de to bring the action to its institution
hurt. So when § stinging taste hath of
§. arm, thos §. patient withdraw the hand
§ muscles to yield, & in so in hypersen
sul § provokes begin to resist on pulling
from those and § circumstances which
make a recent hydatis (different to re-
duce). But if § humours have long removed
out of their place, there are other more
insuperable resistances added, & first
§ ligament inflamed by § accretion,
begins to granulate, that § inflammation
is not violent as when § air is let in,
& it may so close round § narrow neck
that there will not be room for § vessels
to purge thus § state § is made. Nor
when § muscles of § body, that not instruc
are kept long in one posture, § spirits
grow stiff & this stiffness is not chiefly
in § spirit, but in § muscles, so that § §
cords

cedo of hamistringe in such a case) we) nād do)
lowe), & yt. same must happen) to ägreater) de
gree) in a state of lupātion), where yt. Inflam
mation & irritation go along wt. yt. fracture). When
you will consider) that yt. muscles are along
w). yt. ligaments very often torn), and broak)
violently stretched, & yt. Inflam.n on that acc
count) is still greater) —,

We must) likewise) take) into account
yt. adhesion) of yt. lacerated & inflamed) mus.
cles to yt. neighbouring parts, as also yt.
effect) of yt. bones themselves, that) yt. edge
of yt. rectal) pulls against yt. neck of yt.
bone), & yt. Inflammation) of yt. bone &
membranes (disposes it) to produce a new
growth), as I have) found a process growing
(edge) of yt. scapula), which had certainly
similar) process growing out from yt. head
of yt. humerus), so yt. reduction was
impossible till these) were broken off, & some
times often) a luxation. yt. bones themselves
alter) in size & shape), growing
a great) deal longer), & that) wh. are there
to re fracture of yt. bone), or growth of
callus

allow. So if reuiolences are continually in
creasing, but it is impossible to fix on a time
when the obstacles become altogether insuper-
able, which must depend upon the age, consti-
tution, cause of the accident, & treatment after
it. I have seen where a Lupation was redu
ced after 20 or 30 months, but in a great many
other cases after 12 or 15 months, the reduction
was found to be impracticable, & there is
a certain enable swelling of the part, Surgeons
have laid it down as a rule to delay till
the swelling subsides, & this may be very
time necessary, but if an opposite rule
was to be observed, that is to delay making
the swelling, we should meet the attempt
of reduction, we would be more successful
& put less uneasiness to the patient, for the
bone out of its place is adding to all the
violences I have mentioned, indeed if
the swelling is very large we may delay a
little, but if it is not very excessive, the
attempt is to be made as soon as possible
but before we begin I think it a good rule
to let blood, which if done the pain

mus-

muscles, & tends to diminish ye Inflammation
yeman treatment, we would likewise endeav
our to keep ye Part by fomentations. May
I would propose yanthon that ye blood should
be let in a large stream, ye patient standing
& from a large orifice, in order to bring on
languor & faintness, when ye Surgeon would
begin to attempt ye reduction. This how
indeed an appearance of cruelty, but it
saves a great deal of pain to ye patient, &
makes ye chance of success a thousand time
greater.

Now so far being settled, let us suppose
ye case of Inclusum Cubiti, & I shall take a
general example of ye

Luxation of ye Humerus as being
a considerable joint, & occurring ye most
frequently, you know ye manner of reducing
it. The Surgeon first considers ye
posture of ye patient, who is placed upon
a low chair. He is next to think of ye man
ner of making his extension, & counter ex-
tension or resistance, & we ought to ob-
serve one rule here, yt we should only

ye

y. reverse point, & we are now to take hold of y. hand of y. arm for receiving y. arm but of y. humerus distal, many muscles on our body passing over two points, one y. biceps from y. scapula to y. fore arm, & we ought to relax these, some relax y. scapula by bending y. fore arm.

Next we lay hold of y. member, & y. common way is to take a towel or handkerchief, & to form a band upon it, putting that y. middle double, by which we can make a purchase upon y. humerus, & we give y. two ends to y. assistants, there must be upon the fore arm equivile, & posture is altogether so fore arm will be requisite than might be imagined, but there is necessary to keeping bones into their place, as if we y. point of our finger, building on a simple instance, where y. Os humeri could not be reduced, & where it got into its place in y. night time, when y. muscles were relaxed perfectly, & y. arm had got its twist. But generally two men of equal strength at y. person are

pulling

...ching are necessary to plow y. humours
nd that they are necessary when pul in such
a posture, as to (...) w.t y. full strength
of their body, but in y. common way of
pulling (down), whilst others make y.
resistance. A common method is that
one grasps y. shoulders, another the face
hold of him, whereon a humour (...)
in a time in y.t manner, have only y.
strength of one person, as one ought to place
one behind another before, & so through
to endeavour to wound his body & along
w.t it y. Scapula, the Surgeon placed
himself on y. outer side of y. patient
& his Bandage is to first y. arm, after y.
breast are separated, to his proper place &
he may assist a fellow by a second wound
his neck & y. patients arm, but his head
better must be his assistance, as he merely
endeavours to give it y. proper direction
Some to (...) this w.t more force put a pillow
pin covered w.t cloth, beneath y. humane
pub, but it is usefull to use y. hand
for not only y. skin, but y. muscles &
nerves

nerues are bruised, which occasions numbe-
nesse & paine to ye patient.

Some advise to lay ye patient on ye
floor, ye assistant to throw hold of both hands
ye diuine of ye side of ye patient, & his
foot towards ye pillar, & putting his heel
into it, endeauours to separate ye humours
from ye vessells, But suppose ye same
in that manner, often repeated attempts
which are better than great force, may by
perseverance not will often succeed, wearying
out ye muscles of ye patient, & weaue more
likely to succeed if ye patient from fatigue
grows faintish, ye yielding of ye muscles
having very great effect. But suppose
ye above mens commun methods disease
fail vse next

Have recourse to Machinery, & so
long ago as ye days of Hippocrates an Ambe
was used. But it is to day growne
as it begins to extend, so that ye bones are
pressed against each other, & cause in danger
of being hurt. So ye late Surgeons have
paid more attention to ye separating of
ye

yt bones, which may be done in various ways as by a case of pullies which have a progressive force; & these may be put into play as in done by Belil, & after making yt extension in this manner, yt Surgeon endeavours to bring yt bone into its place. But if you let go yt machine, yt bone falls back, & while it is kept extended, yt hand cannot have yt full effect. Besides yt place of it is supplied to us in a more simple & better manner Instead of making yt resistance against yt Scapula, we make it against yt body whereby yt muscles yt go into yt humerus are not grasped. The machine is yt invention of yt late Mr Fennic. A Bepid made to fold in yt middle, for yt convenience of carrying, it is fixed by screws to yt floor, & it ought to have a broad base, or pieces going down at a right to make it quite fast. Next bending yt fore arm, we apply yt tapes, & we farther study yt posture of yt arm, bringing it a little farther forwards, then when yt arm hangs by yt side in order to

to slacken ye pectoral muscles. Whilst we
stand we need to have a sufficient resistance
from ye machine to fully stretch them
to make it lay a tell, which is known over
ye shoulders, but we would likewise
stand ye strong person should put his
hands grasp ye shoulder, otherwise ye
force of ye machine is lost, & ye wheel
spin we pull in a more similar manner
than w^t ye Pectoralis Instrument, & we can
direct ye head of ye Humerus as we please
& we have all ye advantages of Hippocrates's
table. So this machine is as good as one
can expect for ye purpose w^t a little
amendment. Still however w^t it you will
find, so that we ought to remove some
further methods. Pray nothing of ye spasm
of patients arm over ye surface of a ladder
while ye assistant is drawing away, w^ch
may break ye bone.

But one method remains which I
began to believe to be superior to all
others, & which perhaps ought to be used
in all cases. I mean ye hanging ye patient

patient up by his arms, on which come to
much y^e same y^e raising y^e arms above
y^e head, pushing it strongly upwards. This
was first practised by Mr. White of Man-
chester, then some Surgeons in this Country
had a practice very like it, particularly
Mr. Millar at Glencaldy, who set his
patient on a stool, tied his arms to a Beam
in y^e roof & knocked away y^e stool. Dan.
White ever lies in explaining y^e same
the real method ought to be this, y^e patients
body is to be raised from y^e ground, & y^e
weight may serve to disengage y^e bones
But suppose that not sufficient, y^e next
thing is to raise y^e body by y^e arms (ben-
ding y^e same) by a signal, to y^e height
of seat suppose, then by a second signal
to let go y^e rope with a stroke. Tried
this in one case, where a famous Bone
setter had applied his utmost skill
& strength. Had y^e patient tied by a
rope to a beam in y^e roof, & two fea-
thers beds laid beneath him, he
was raised first by y^e arms upwards

&

& downwards wt very little effect, & wn I
suddenly drawn up a foot or two, & so suddenly
let down again. After this had been done
for to times ye bones were lower, & in fact
more they became so low, that they readily
went in, & I have since succeeded, in other
like cases where ye bone had been cut &
treated in ye same way. The patient not
hurt so much in ye operation would expect, he
is frightened, but this causes to begin on
a degree of languor & faintness, which is
of real use, & ye pain he suffers is not
so great as in ye former methods.

Next suppose ye dislocation of ye
fore arm, I believed you ye place where
ye dislocated bones generally are situated
we buy to disengage them by drawing
them asunder, & we have such power
held, yt if ye thigh be diverted we shall
seldom fail, if ye fore arm be so much
distorted, yt ye large process of ye ulna
has turned to ye fore side, from ye
tearing of ye ligaments no doubt ye
treatment will be more difficult.

In

In like manner if y^e. Lupation be in y^e. middle
or fingers, it's easily known & for y^e. most
part easily reduced; But sometimes difficulties occurr, which cannot altogether
account for. Mr. Adie was never more
at a loss than in reducing his fingers, wch.
cost him an hour or two's work. In like
manner I have seen a great deal of work
in reducing y^e. Great Toe. In one case, y^e.
bone had been out 10 days, & it required
y^e. greatest strength of two persons pulling
to reduce it, but attending to posture &
slackening y^e. muscles, y^e. difficulty is
generally not so great. We may meet
wth. Sprains like Lupations, but there is
only a swelling on one side wthout a
corresponding hollow; Nor y^e. swelling
may be so hard, y^t. we might suppose it
bone. The Lupation of y^e. ancle (very
easily known) by y^e. length of y^e. foot &c.
& y^e. shape of y^e. part affords a convenient
way of making y^e. traction. The knee
is sometimes a subject of Lupation
which is curable, See one Case in Heister

&c.

&c. & I have met w.th many, I am sure, of the
opinion, as Surgeons have done, from conceiving
that here y.e ligament must be torn, & supposing that it is so possible that it must be
fatal, so that they advise to have recourse to
amputation, but if there is not great contusion, we would endeavour to make a cure.

The last point is that of y.e thigh, & I formerly showed you not only y.e method of distinguishing, but of treating it. Supposing y.e luxation inwards, we first bend y.e thigh nearly to a right angle w.th y.e body, & elevate y.e Psoas & Iliacus internus muscles by turning y.e foot outwards, we give y.e knee to two assistants who pull it strongly, while two more hold y.e pelvis firm. The Surgeon placed on y.e outside grasps y.e top of y.e thigh w.th one hand, & y.e bottom w.th y.e other & bracing in y.e knee y.e bone may slide w.th great readiness into its place. But when y.e luxation is backwards, it is more difficult, & we follow y.e method recommended by Petit. We take Petit's Instrument w.th a Screw, by y.e aque into

y.e

of groin, dipping of other legue above of knee &
after of explosion is made, of Surgeon draws
out of knee & pushes in of knee of leg.

But wt regard to our Bandaging of
limbs after removing Amputation, of old method
was to lie them up in after a fracture. But
state given a slight case, where after reducing
of joint of of thigh, of patient would walk
about a Bandage, thereby sparing suffering
more. But of joints need Bandaging more
& less, according to of nature of motion they
perform. The Ball & Socket will need
Bandaging least of all, & of hinge next of
thigh, will therefore dress most in next
of it, as present of motion which promoted
of Cupation, if it is inwards little more is
necessary than to tie of two knees together
wt a Garter. But let no Surgeon think,
of applying that only, for of patient will
not more freedom than of Surgeon allows
& he will lay of blame upon of Surgeon
as he ought for having used to apply a
Bandage, which can do no hurt. In
like manner when of humerus is reduced
he

to put on y^e^ Waistcoat, & wrapping a bit of soft linnen
y^e^ arm, puts it to y^e^ waistcoat to keep it immoveable, or
he puts (a) scarf to it. But I would prefer to adopt
a compress, of two or three layers of open bandage.
If y^e^ fore arm or hand is swelled, a careful
bandaging and attention to posture is necessary, as
taping y^e^ parts as much as possible. But when
y^e^ parts have recovered their tone, y^e^ bandage may
be slackened to allow of some motion, to prevent
y^e^ stiffness or concretion of parts.

Lect: VIth

The nature & treatment of fractures, we must
remember that of luxations, that we are led next
to consider this subject. We readily discover
a fracture from considering y^e^ previous accidents to
y^e^ part y^e^ patient has suffered, & continues
to suffer in y^e^ part, y^e^ swelling of it, y^e^ shortening or distortion of y^e^ member, & when y^e^
Surgeon takes hold of y^e^ two ends of y^e^ bone
he is sensible that a particular place yields
like a joint, & whilst it yields, he feels, &
seems to hear y^e^ crackling or grating of y^e^
bones, or as Surgeons speak, their crepitation, so that if proper attention is given

you

you will seldom fall into mistake.

Note if the way of reducing of bones, & all simple above, what I have said in the Dislocation nearly applies, for I would be much cautious to reduce a fracture as soon as possible, rather than always waiting till the swelling have much inordinately subsided. We draw blood freely, if it has been hitherto neglected, use ferment. of pearl, ashes by an emollient poultice for a few hours, or if severe 2 a day, but let no more wait till an inflamm. in the case of fracture shall subside in a great degree, for if sharp extremities of the bones hurting the muscles, maintain the swelling, or even increase it to a greater degree, & by delay the Surgeon loses instead of gaining ground. His own judgement must therefore very much determine him, but if best general rule is to attempt reduction as soon as possible.

The manner of bringing fractures home to their proper place, is nearly the same as in Dislocations, but it is plain that there must be a greater difficulty in keeping them in. A Dislocated bone when reduced, is to hold of its proper socket, whereas in the fracture of

y. smallest attention y. situation y. muscles
makes it slip off again, or in treating fractures
y. Surgeon first makes an extension, & counter
extension, then replaces y. bones w.t his hands
then he applies machines which keep them in
their situation. How for attaining y. first purpose
of bringing y. bones to their proper place, there
is y. same necessity of relaxing y. muscles, before
we attempt to reduce a fracture, that there is before
reducing a luxation. I mentioned this long ago
in a general way, but in one particular y. observ
ation has been first published by Bell, viz. applied
to y. situation of y. leg, I owe to observe y. we
might relax y. leg, instead of obstinately keeping it
to y. straight line w.t y. thigh, but be further
directed to lay y. leg in line of y. force upon
the outer side. To be more particular, if
we are treating y. fracture of y. humerus or
in general of y. arm, Surgeons that they have
paid little attention to y. muscles, yet have
generally "speaking given as much relaxation
as is necessary. In a fracture of y. humerus
y. patient is often confined to his bed
& hence a Surgeon in dressing treats y. arm

hanging

hanging cavity by y^e side, & y^e patient bends y^e fore-
arm & holds it in y^t posture, y^e (advantage) of this
is that he relaxes y^e biceps muscle, & by this mean
we when we are to treat y^e forearm, whether
y^e patient is confined to bed, or walking about. Sup-
pose put y^e arm in y^e very best posture, he will bend
under y^e humerus & hang in a cavity by y^e side
when all y^e muscles y^t can make malpositions
alterations in y^e broken pieces are relaxed to y^e
utmost, y^e patient keeping y^e arm in y^e
posture, between pronation & supination.
The principal improvements regard y^e bones
extremities, Now wt regard to y^e thigh, we ought
not to stretch it into a straight line wt y^e
trunk of y^e body, when y^e muscles tend to pull
y^e pieces asunder, so we ought to bend y^e thigh
in ~~a general~~ to an angle, & further y^e thigh
ought to be laid on y^e outer side, which will
direct us, & add y^e reason yt on y^e joint of y^e
knee performs flexion & extension, y^e thigh
muscles are on y^e fore & back parts, so by
resting on y^e outer side, y^e bone is nearer
to y^e surface, & y^e broken pieces better easy
pulled in its whole length. Now, wt

w.ch regard to yt. leg, we ought to bend that upon yt thigh, for when yt patient stretches his leg, yt whole leg is drawn back. Note bending it under yt knee, we might have it bent, resting on yt back part, yt muscles are relaxed in that manner, but then yt knee projects in one part of yt bed, yt foot in another. There is a difficulty of preventing yt cloaths from pressing on these, the rule to yt relaxation of yt muscles, it is yt we are to consider yt body to lie on yt side or back. But I prefer Pott's method of yt side, because yt surface is smaller, & one part stands up leaving inconvenience, or to require contrivances, which are embarassing. But it is material to have a clear view of yt muscles are equally relaxed in both ways, for one would imagine, yt yt changing from yt side to yt back, was yt making a total change of yt muscles, but yt patient may shew yt reluctance of a change of posture (it is easier w.ch regard to yt trunk, that yt patient lies upon his back, but tho yt leg be upon yt side, it is not necessary that yt trunk be upon yt side, for yt patient may rest very much upon yt back, while

yt

if by resto upon y^e side). Now after setting & pre-
paring y^e limb in this posture, for y^e posture which
is best for y^e reduction, must be y^e best after-
ward, when y^e Bandage is applied, it is very
possible to turn y^e patient over w^t almost no
alteration upon y^e fractured member, only we
put a pillow under y^e thigh, or we may have
contrivances, such as I shall show very soon
al y^e same kind attention should be paid to y^e
raising y^e whole body. The only contrivance
for this purpose is a rope hung in y^e bed, w^ch
requires a very great effort of y^e muscles, I
saw a very excellent contrivance by an ingen-
nious Gentleman, a bed w^ch a hinge in the
middle, & by turning a handle y^e body was
raised in y^e most equable manner. I sai-
d so far we would observe of y^e general posture
into which y^e Body may be put.

Next having y^e dressings ready, we
begin to reduce y^e parts, we press down
y^e muscles from y^e upper part of y^e frac-
tured bone in order to relax them, & an
assistant holds y^e upper part steadily
making y^e resistance, another takes hold
of

of ye inner part, & makes ye proper extension wch he
knows, for if fracture is attended to, soreness will
occur where ye muscles & tendons unite to
ye attenuated, the surgeon then manages ye
bones pieces, as to bring together ye extremities of
ye bones, & you will observe how ye two ye bone
be broke in two places, & middle piece taken
we are not without urgent reasons, even without
assurance yt the fragments are united in ye
proper manner, & bringing on tumefaction &
pain it. Then laying ye dead part upon to ye in
mediate ye danger greatly, as if one person
has his leg broke by a blow wth a blunt in
strument, & ye skin sound, he will recover
better than one who has ye bone cut wth a
sharp Instrument; & if a tooth can be trans
planted from one persons jaw, into another
or ye testicle of an animal, alone with the
same readily, with remains concealed by the
periosteum, & still has ye circulation going
through it, that life greatly than begins, & is
capable of producing callous matter, & has
suspecting ye bone properly adapted, one kept
considers ye manner how for retaining the

1 They employ'd w^t a view, of supplying y^e former
stone, or keeping y^e limb straight, & preventing
retraction, some substance dipped there in common
bandage's, some have used metals, others leather
but y^e substance which is most common & y^e
best, is thick pasteboard, well soaked with
water, & a sponge, so as to take any shape of
y^e member & soon drying, it gets sufficient
firmness, y^e thick pasteboard has a further
advantage, that y^e veins running in y^e in
teriuces of such compressions, & which Surgeons
call splints, and need from too much compress
ion, & y^e Circulation goes on better. The splints
were formerly made very short, but a long
splint, extending y^e whole length of y^e mem
ber is evidently preferable, for y^e broken
part comes to be a centre of motion, & y^e new
bone first they extend from y^e fracture, to con
fine that motion y^e less, y^e bones and asso
ted. But there is no necessity y^t they s^d
extend beyond y^e bone affected, because from
y^e practice recommended, y^e rupt bones are
not brought into y^e same line, as in y^e
fracture of y^e thigh. For in this case they
only

yt. Under. I am recommend to them but yt. I shall have answer as well & we can have it always ready, for we need constantly to have yt. measure.

Now, if we study yt. posture, it is evident that in common people, there is no occasion for any other machine, but it is right to know what have been proposed, especially yt. we can adapt them wt. advantage to particular cases.

I have said nothing to the rule of what we called Junks, some substances covered wt. straw, & which are put on yt. whole length of yt. member, for, from yt. situation recommended, such substances cannot be assured & they are very troublesome. But I am shown that by yt. binding of yt. joint & yt. knee, which yt. patient is bidden to bear hard, yt. muscles can be strained very considerably, it is worth while for Surgeons to make improvements to ye machine of Petit, which answers very well where yt. leg is extended, & may be used to exercise in yt. posture I have recommended, but bends to a less for machine yt. extension which

which is very simple in the conclusion, as you'll see
in put into it. The case not (in former case) bad
upon y. bop, as y. compound fracture &c. & after
y. leg is dressed, we first use y. rule proper
to support y. leg, & if any part is not sufficiently supported, we put in a little tow, then
we raise y. sole proper to prevent y. (fractured
bone bearing on y. point of y. toes, & we can
raise y. Bop as we do a writing desk, at lo
ring y. Circle, & we might use it when
y. limb is laid in y. best posture, by making
a joint at y. knee. 6

If we want to transport a patient w.
a broken leg, Gooch has proposed a case
of wood, by applying of which, he may be
transported w. great ease safely. 7

Next suppose a very obliqe
fracture deep seated, can not by y. manual
of y. thigh, or suppose a compound fracture
where there is a contusion round y.
teguments, w. a lacerating of y. bone &
this may be much better reduced than
regard to posture than in following y.
old method. But if we are not able to

to succeed, we would imitate Gooch, instead of amputating, in ord to explain the operation of the lower then reduced them, & yt would well have followed. But to assist in this machinery is thought to be necessary for exploding yt bombs, & other inventions, which Mr Gooch has invented for this purpose, & was aware of that time, where yt Knight has mentioned by a tunnel entering on yt outside & behind mentioning a large mound. My Fabian contrived other, which with a button is made to act against yt pelvis. The bone had to withstand pressure of the weight, & yt pressure drove it together, & as soon as had overcome yt force & made & brought to yt end of yt bone to press upon extension, merging yt pelvis for same days, & part of yt bottom of yt machine drew out, to allow yt wound to be dressed. But it became intolerable on account of yt suffering, & yt attempt was at last given up. Gooch mentions yt inviolance on yt Knight, by a tunnel put above yt fractured place, while yt inviolance is made by another circular above

above y. knee, & a third under it, wch join' y.
two fractures by means of extenders of mine
& make y. extension by turning screws, as
when gained by y. one alone: wch fix the other
& joint is added which makes it a bett', and
have contrived a machine upon y. same
principles of wood, where y. extenders
rise more from y. thigh, & more quick for
applying counterpoys, it has leather straps
&c. Dr Potter gave you a continuance of Mr
Wilkins a Surgeon in Town, where the
matter of resemblance not upon y. thigh, but
upon y. joint & was supported y. machine
by proper straps passing between y. legs.
This machine will be of great use, where
y. fracture is very near to y. hip & y. thigh but
we ought to bring y. limb into y. natural
taped posture by bending it, this is intended
for y. limb lying in y. same posture, in y.
same bed w.th y. body but if one of y. fractures
then were made to bend, y. thigh might be
hooked downwards in y. bended posture of y.
foot. Therefore having occasion to write,
machines in compound fractures where
y.

y^e suppuration is longer, we add to y^e Diaschylon
Incco of Lead or Wax Cloth over y^e Bandage
to prevent y^e matter from spreading, & that
we may not be under y^e necessity of taking away
y^e application altogether; we also y^e same being
Wet y^e Lint, always upon removing it.
And y^e long bones y^e Clavicle remaining to be
particularly mentioned, which is sometimes
Lupated, & very often broken, I am in the
case it will occur to you that y^e principal
Extension here is, y^e Drawing back of y^e
shoulders, for y^e very use of y^e bone, is to
support y^e Wounded Arm from y^e Thorax,
from which we draw this back
by a very slight bandage is sufficient. These
generally used y^e figure of 8, but it has not
y^e full effect, as it gains y^e arm pit, or
by a well contrived Waistcoat, which is
drawn w^t. Laces behind may be
done, & we may add other straps, to supply
y^e place of y^e spica Bandage, & y^e more
which cannot here be made to apply y^e
accurately, now w^t. all appear (does
of trouble to y^e patient, & we still want
some

immediate simple machine to answer ye purpose here
of that where ye Clavicle is broke, a very convi-
derable (deformity is frequently left, I may
add one) Inconvenience farther; where ye muscle
is to send a member against ye power, we
may have recourse of wood which slips into
each other, wth little of bone passing over ye
which can be slipped and drawn. I am sorry
to place it here

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We have not considered fractures in a gen:
way, but some particular cases proper
to be stated. It has sometimes happened
as where ye humerus was fractured about
ye middle, & ye treatment not very regular
that a joint or motion remained at ye
fracture place. Now for ye prospect treat
ment of such a case, we are indebted to
ye ingenuity of Mr White of Manchester
who proposes to make an incision into
ye joint, & to saw off ye ends of ye bones,
& thus reduce ye case to a compound fract
ture, wch probably bones, when ye parts
extremities need take amputated. may
perhaps

perhaps yt. exposure) to yt. air alone might have been sufficient, when yt. bone is simply & readily cut'd, but even where there are bones, we may call'd assistance &c. In like manner in yt. separation of bones where yt. end protrudes, inclined of bearing recourse to amputation, if there is no other contusion, we would call yt. piece (& not yt. bone), & yt. motion of yt. joint may still be preserved, see a case of this kind in Broomfield's Book, may in some cases intend notwithstanding proper attention to preserve yt. swelling which came on before yt. surgeon was called, it was found impossible to replace yt. bone, apart of it being call'd off, & yt. member brought straight, keeping yt. ends in view of yt. Surgeon, & now & then found to join yt. bone, w.t Cartilages, & all yt. necessary appearance for motion, See a case of this kind in Whites.

Not removed particular bones, & particular parts of bones, which may be preserved, & where attention is to be paid of every different kind from what

a

I have mentioned, among the their situation, supposed
angel of succession which cover & protect our joints
& some to divide their motions to two kinds, as
clavicular, of acromion, of patella, of succession
of leg bones, except to under a very different
position from what is generally recommended
in practice. Thus in of fracture of of fore
arm we recommend of bandage should, but
if of clavicular is broke, we must place
of arm in order to relax of biceps muscle
which is inserted into it. In like manner
if of acromion be broke downwards, or fractured
by of fall on humerus being pushed upwards of
it, we relax of parts by bringing of arm
a little forwards, & putting it upwards &
it will be right in time of first week
or of certain degree of motion, whereas
in other cases of fracture, of head of os
is never to shift of bandages till of end
of of bone, unless of part has been used
to, & of bandage grow slacker, when it
we ought to tighten it, & our first attempts
of motion ought to be about 14 days after
fracture of of bones, according to

former

forming before that time.

One particular bone of the skull is more to be located in a particular way, whether it is cracked or fractured, I mentioned of manner of producing it, when I spoke formerly, but I suppose that one have made of modulation, how one may to trust it in its place, for it is very apt to fall out. One Gentleman who often (as I deduce here not with that accident (it had slipped out 17 times, I dismal him to apply a solution to of outer side of it &c but I have lately thought of a contrivance which will answer the purpose tolerably well, if it is made best by Wilson of the Leg maker.

Next suppose the patella fractured which happens generally not from blow giving it against a obtuse substance but by a sudden effort of the muscles, especially when the bone is drawn upon the edge of the pully, over the cavity of the joint where it is not fully supported, you will find the dislocation & the other at the Surgeons proceeded here with the same caution

caution as if y^e^ leg was broke, y^e^ muscles were
extended, & y^e^ bruised pieces kept together by
a bandage, & y^e^ patient confined till y^e^ union
was compleated, which might require 6
weeks or two months when it often happens
not y^t^ y^e^ motion of y^e^ joint was lost, partly
from y^e^ joint & muscles becoming stiff, &
partly from y^e^ growth of callus. But of late
years Mr Warner & some others, advise to
allow y^e^ patient to move y^e^ joint soon as
may y^t^ we ought to make y^e^ flexion &
extension of y^e^ knee. Now I cannot but
thinking that these Gentlemen run into
an opposite extreme, for from y^e^ great size
of y^e^ joint, & y^e^ great motion of y^e^ patella
upon y^e^ knee may be drawn no just
wonder, that y^e^ granulating matter we
not able to connect them, or that y^e^ fore
of y^e^ extensor muscles of y^e^ leg, must be
entirely lost, & in this case an unequal
callus will grow out, nature taking care
to fill up y^e^ void, so I would obviate a
medium between y^e^ two extremes. 1st
is altogether necessary y^t^ y^e^ leg be fully
extended

should in order to relax ye extension must be
fully, & we must bend in more to keep ye leg in
that posture during ye cure, & for this purpose
we may use ye assistance of some low bed to ye
leg & thigh in ye shape, or we may apply proper
splints (even in ye same manner), & instead
of bandages made in ye common way, I shall
recommend a couple of shapes placed to ye patella
(as afterwards prescribed down ye muscles &
ye upper part of ye leg, we must join
ye other, then buckle ye straps upon ye mem-
bers, & lay down ye first shape, & draw towards each
other ye two circular, & to prevent motion, lastly
fill ye hollow of ye, or sunken, or space with tow
hard, or I might say ye person lay in ye title
posture (viz. giving a relief to ye patient by
raising ye leg higher or lower). In about 30
days or a fortnight we slacken ye straps, and
examine ye state of ye part, & we begin scarify
to allow of a small degree of motion, & consider-
ing ye cause as ye nature of ye thing will admit
to shape ye callus to ye joint. so we gradually
ye relief ye art allows of, without ye hurt of ye
ye patient having ye strength of ye muscles if
ye

y^e fracture be longitudinal y^e treatment is also more simple, we keep together y^e pieces by compresses, put in at y^e side, & use easier & more easily allow of y^e rising & extension of y^e joint, & we are not provided w^t such obstacles as I have mentioned, we may employ y^e rollers y^t have been recommended w^t proper compresses.

We are next led to y^e treatment of lacerated tendons. The tendons at y^e heel you know to been often lacerated; & not unfrequently either y^e tendon or ligam^t connected to y^e patella partially y^e tendon connecting it to y^e tibia y^e whole force of y^e muscles being concentrated upon it, while there seems to be fewer fibres in it than in y^e tendon above, or perhaps it is more readily observed y^e want of y^e flesh hindering us to feel, y^e exact so exactly, but y^t it may be lacerated above y^e patella. I know from one case of an elderly Gentleman who came down one of our Hospitalmen, slipt his foot & endeavouring to recover himself made a great effort, did not fall to y^e ground, but felt on y^e a tension & pain

pain

pain about his knee; & I felt above it a great
fullness into w^ch I could lay y^e whole breadth of
y^e Thumb, & above y^t y^e hard edge of y^e bone
w^ch was torn away, & had carried round of y^e tran-
sverse Cartilaginous Covering of y^e patella, w^t it, y^e
method of Cure I proposed was this, That y^e
was laid in bed, & y^e leg fully extended, I got
y^e Circular bottle applied above, & below y^e knee
first pushing y^e muscles down from y^e top
of y^e thigh, y^e whole way, & not contented w^th bind-
ing them in y^t posture, we began a very thick
roller at y^e upper part of y^e thigh, & continued
it y^e whole way down y^e edginess, w^ch pushed y^e
muscles down before it, & to prevent it from
slipping, we put a circular round y^e patella
w^th sharpe, we were contented w^th a common
long Bandage, but perhaps a flannel ban-
dage would be better, first, shaving off y^e hair
after y^t y^e under Circular was put on, & y^e
patella pushed as high as y^e ligament w^ch
admit, & having drawn y^e Circulars together
we applied a Case of pasteboard of convenient
length, & tied it w^th a few strapps, y^e cure
was so complete, y^t in some months he
could

could stop into a Chair, or walk up stairs, without any great difficulty, that for ye first two or three days he scarcely ventured to use ye left knee at all & ye joint still bend it much. — Now this treatment is equally proper for ye laceration of any of ye tendo Achillis, & what happens to ye tendon happen likewise to ye belly of ye muscles, & I have seen several cases, where there were symptoms of a true rupture, & yet ye Surgeon mistook finding ye laceration, by attending only to ye state of ye tendon. Here ye great matter is to relax ye muscles, & to keep ye lacerated parts continuous in a steady way. In this point it is evident, yt ye position of ye foot to ye front & principal way of relapsing. But there is another thing necessary, wch have been overlooked, yt ye outer point of ye knee ought to be bandaged hard to relax ye gastrocnemius externus, wch comes from ye thigh, & yt in ye proper posture during ye cure, whether ye patient lies sideways, or upon his back it makes no material odds, as to ye state of ye muscles, but ye knee must be bent. — My Father who had a sufficient

in view

himself, have devised the method of drawing the parts together. He had a slipper of Iron to fit the foot & wch tied wth strings, & it was open all the time for the fracture of the leg against the Iron, became intolerable, there is also a strap behind for drawing the foot into the intended position, & keep the assistant a piece of Cloth to the leg, filling it exactly, by wch he had a firm hold of the muscles, & he stops this by means of wooden Buckles. He then extends the foot, & draws down the heel of the muscle & putting the strap he kept it extended, & further to keep the foot from rolling, or to guard against any impression motion in time of sleep, a piece of Tin was tied around the foot & leg, that except in time of sleep is not necessary. When the patient has got a sufficient degree of firmness, let the patient consider all the effects of fracture, & avoid all the actions that obstruct it, bringing the strength upon the wound leg, & when the parts begin to unite, he uses a very high shoe to the sound, gradually lessening the heel. Then the more particular directions, see the Physical Essays, where you have an account

account of these instruments.

The directions mentioned in the last case, apply in general unto the dissection of tendons minutely, or the division of them by wounds, and also of muscles, all supposed they are wounded, if there exist a tendon in the part, without seeing the parts in the same way, I will exist a tendon exposed by a wound. But if wounded tendons, notwithstanding attention to posture, will not most accurately, prove no objection to the seeing them, you will find Surgeons very inconvenient here in the same hospitals, through the utmost sensibility, & dreadful sympathy attending wounds of tendons, & at the same time no comprehending the seeing them in case of wounds. Nor suppose that the tendon is wounded in the sheath, or that the sheath of it bursts from an effort, without any study situation, we ought to give the patient a liberty of making motion in a certain degree, during the cure, that the motion may not be lost, &

If in consequence of treating of this

hand

kind in fractures & luxations, any joint of ye body grows stiff, or if ye stiffness in ye convexity of ye vessel, besides ye usual remedies employed, we have a Hop, for unweaking a member w^ch vapour. purposes ye leg, ye part diseased, ye joint of ye knee, or ancle stiff. ye method is to cover ye bed or Table w^th a blanket, w^ch may be wrapped about for ye warmth & to confine ye steam, then there is a place of ye hop, w^ch is lined w^th tin & enough of wine is given by ye virtue of ye heat & by ye workman not being discerned to pour ye several parts of it, w^th very great accuracy, or if he should, we have a door, a useful w^ch opt of wine is put in, or what will answer better in most cases, ye steam of boiling water, as from ye end of a Tea Kettle, or we convey it from a Leathel. chest, & it may be known in by a number of Tin tubes, & this may be conjoined to ye limbs, or extended to ye trunks of ye body.

I should you a very curious preparn. of ye Club foot, by this is generally understood a dislocation of ye joint of ye ancle, but it is really in ye joint of ye Tarsus, &

to

it is material in y. cure to have this (idea), because if we conceive y. ancle joint affected, we think y. cure impossible, unless we lay hold of y. leg & fot, w.th y. machine, whereas it is possible to cure y. disease, w.tout laying hold of y. leg at all. The rotation of y. leg is performed by y. Os naviculare, on y. end of y. Astragulus, y. other joints concurring toward more particularly y. Cuboid moves on y. Os Calcis, & all y. rest in a smaller degree. In most natural cases of y. kind, y. compl.t is born w.th ye gentle y. foot is so loose, at y. place of y. rotation, y.t you can turn y. joints of y. toes inwards at a right angle, so y.t y. toes of y. two limbs come to be in a streight line. But that we can cure y. first bring y. foot streight, w.tout y. child suffering pain, & can hold it for some minutes in y.t posture so y.t y. whole disease seems to consist in a relaxation of y. ligaments, if y. compl.t has continued long, y. nat.l shape is to be altered, & in every one of y. bones, y.t is a material alteration. Now this gives a suspicion, y.t it may be an original want

want of shape in some cases, upon y. whole if we can bring y. foot to a straight line, supposing even an original fault in y. shape of every bone, yt would be much concealed, by keeping y. foot in y. common posture, & we might at least relieve y. pain greatly, in some cases along wth dislocation inwards, yt & in a complication of y. dislocation upwards yt y. top of y. foot nigh comes, so we must here also suppose y. convexity (downwards) & make y. v. to stand. Wherein hand been proposed by Clowlton &c, wch will in common cases, certainly fail, he proposes to bring y. foot to y. proper posture, & to apply some convenient wth a paste of flour, & water to prevent y. motion. Now this is not adapted to prosp down y. (immediate) & we attempt too much at once, for tho we can bring y. foot to y. proper posture, after a few hours this may give great pain, so we ought to proceed by steps. Besides Surgeons endeavour to heat y. foot separately, wthout having y. idea, of y. one foot in y. next antagonist against

y.

y.e other wherein the Shoes should be fitted to y.e wyre of y.e pal: & y.e top of y.e shoe to draw w.th buckles, in order to prese down y.e cumpily
Nor they should be filled to y.e same plate
of wood, or metal, & hand a tenbue pin at y.e
heel &, y.t should be in y.e plate a number
of holes, Sometime after, I had the p.t of this
I was called to a patient labouring under
y.e complaint, & y.e found y.t some person had
been before hand, w.th me in y.e very same
idea, for y.e Father brought out me out a
pair of shoes, w.ch he had got from y.e wood
of England, y.t two shoes were joined toge.r
by a piece of metal, w.th a tenbue pin, &
y.e shoes were made to play upon it, & a
number of small holes, were made in
y.e circumference, so y.t y.e foot could be
turned out gradually, & by.t means a
streight direction, this was tried on y.e
patient, but y.e disease had continued
too long, so y.t after a trial of some mo.s
it was laid aside, w.th little benefit, but
by perusing this idea, we do all y.t can
admit of — Lastly I am to ex-
plain

plain y. dressings after amputation, suppose y.
amputation come in y. knee, we cover y. veins
w.th lint to a certain thickness, then put on
a compress of Tow, (drawn out in y. simple
manner, w.ch adds to y. warmth & serves
as a defence to y. end of y. stump, now formerly
to support these dressings, a compress was
employed named y. matlo cushe, it consisted
of several pieces of linnen, sewed together, & then
cut from y. corners. But when you apply
this, y. thickness becomes in some measure
unequal, & there is a greater thickness on
y. part, than is generally necessary, we
now substitute in place of y.e two bits of
abovesd cushes y. breadth proportioned to
y. size of y. member, Dan.l applies
my bandage. Some ingenious Surgeons
have talked of applying thick compresses
along y. course of y. vessels, w.th double
headed rollers, w.th y. view of checking
them.y, but in y. most common way of applying
these, they rather increased y. them.y, because
they affect y. veins, more than y. arteries
in y. amputation, when y. Tourniquet is
(drawn

drawn to ye full tightness, you stop ye bleeding, but if you slacken it a little, it bleeds, because ye vains are more affected than ye arteries, ye those Bandages are all to be discarded from practice. Ye latter or single, or some choose a double Incision rather, we begin wth a circular or two to support ye dressings. Now what ought to be ye Assistants Surgeons part ye roller wth a pin, when they begin just to cover ye end of ye stump, then make severall circulars, till they come to ye ends vide, & if they want to have every thing fast they put in a 2d pin, & respecting those turns they make one more descents on ye stump till they give ye bandage a tolerably neat appearance. Now ye effect of these reverse reverted turns, is chiefly to draw ye flesh upwards, & we could not do any thing yt would more certainly have yt effect, as ye reverse turns, should ever be tho' ye, & ye only use of ye Bandage is to support ye Compress, we and only have ye to make a few turns to ye very bottom coming from above downwards, & then we pin it, & ye same objections apply to ye

(double

double headed roller, w^ch by making a stronger compression, (does still more hurt, or else ought to have nothing more than a slight case, or a piece of sticking, w^ch in effect now & then does & we put on a garter to secure it, or we begin a few turns of a bandage above & roll downwards if y^e bandage is to be applied to y^e thigh, from y^e conical shape, it is in danger of slipping we it is necessary here to tie a thread about y^e stump, & to bring a few strips down to join to it, on y^e which may put on a plain square w^t y^e thigh slit before & joined by a lace & to prevent them from catching cold, he should have a waistcoat made before y^e amputation, & when y^e thigh is amputated, to prevent it's being shrunk we w^t thread to draw y^e opposite sides of y^e wound together w^t y^e stump in the & a cord. It is out of y^e power of this y^e patient must suffer a great deal of pain, may we disappoint y^e very intention of this practice — that y^e cause of y^e resolution, is y^e violence of y^e distension, & we increase this by y^e wounds, w^ch we

mean

mathe. To we ought to accomplish this end by han
dages properly directed; & there is a possibilite
of doing this without using any great force
We begin wth ye bandage from above, & we
roll downwards, or we use a plaister bandage
in this manner, or if this have not a suffict
effect, we apply two or 3 pieces of pease board
upon ye thigh, in different places, then a
plaster Bandage over all, whereby we
push down ye parts as much as possible
or can be necessy. The only other suppn in
is y ye common method of sewing ye vessels
is ineffectual, in such a case it is necessy
to maintain a pressure upon y mouths of
ye vessels, & perhaps besides to apply some
nothing substance, that ye effect of them
is less considerable, than is commonly
supposed to be. The bleeding of ye lesser
vessels arises from ye Expansion of ye blood
wch in them, from its being exposed to
ye air. Now ye vessels have a living
& muscular power, & they draw together
by means of that. & 3dly means is a
rounding of ye neighbouring parts, which

mechanism

mechanically passes against y^e artery, y^e albumen is of such a nature, as to (dispose) y^e blood to coagulate firmly, but y^e effect is not very considerable, so when such substances as they act rather as compressors, & in y^s view we employ w^t some advantage y^e agaric of y^e oak, w^ch makes a very compact compress & it has besides a small degree of styptickity, as we used to use a piece of dried Sponge, w^ch sticks to y^e part, y^e pores of y^e sponge are y^s in y^t way, y^e blood enters into them, & on getting wet it swells considerably, & in y^t way closes y^e bleeding orifice, & y^e blood more coat upon it more readily, suppose then y^t y^e stopping of y^e orifice fail, or y^t we do not incline to employ Caustick, or in that w^ch is a milder kind of Caustick, because of y^e injury they do y^e nerves, & y^t we use again a dry Sponge, we put a small piece in y^e mouths of y^e vessels, then a larger one, & so on till we have it tightened y^e next, y^t y^e pressure may be upon it then we are directed to apply some substance y^t shall compress powerfully, as y^t pressure

by Goods, it consists of a Circular round y^e. Thumb of y^e. body, w^t. drags from it, inclosing y^e. thigh, & applying close to y^e. stump. Now y^t. may be done w^t. a common Tourniquet, especially where y^e. operation is under y^e. knee in a still better way, we first apply a Tourniquet to y^e. course of y^e. artery, & increase y^e. pressure, till y^e. bleeding ceases, then unpin y^e. part clean, we apply y^e. agaric unspun & perhaps y^e. sponge is rather better, & take y^e. common Tourniquet, & cutting away y^e. roller we apply it to y^e. end of y^e. stump, we then roll a garter above y^e. knee, turn y^e. drag down & pin it to y^e. garter, & by turning y^e. screw, we make y^e. pressure on y^e. opening of y^e. vessels, having allowed y^e. compress & roller, we gradually slacken y^e. Tourniquet, & gently an application of 24 minutes will be sufficient. But I only recommend this practice, when y^e. other fail, for many patients in this Poland, have lost their lives by bleeding to compresses or dead ligatures. Now y^e. sponge comes at length to plate we closely to y^e. part

y^e.

yt Wigle is fuzico han to remoue it & recommende it
me should destroy it wt Caustic; but yt is owing to
ito long allowed to remain too long on yt foul ulcer
yt granulations run into yt bones of it; so yt they
may be covered altogt wt in time may occasion very
troublesome fistula, we should therefore remove it in
3 or four days, or at most at yt first dressing wt
is generally in 5 or 6 days.

Having thus shown you yt treatment
ment yt may be necessary I would make yt
same observation yt I did after yt operation
yt is yt manner of using them & yt necessary
understood wt yt Analomy & Situation of ye
Muscles. You can have very little difficulty in
healing any sore; but will be able to adapt yt
treatment to yt nature of yt place affected

Lect 117

Lect: III

Comparative Anatomy

Having fully considered the Structure of the human body as far as could be done w.ch certainly drawn from the demonstrations to explain the use of the several parts seen many of the changes produced by Disease & the assistance of the whole in the practice of Surgery, it remains only that we attempt to throw some further light on the talent & operations of the body, by a comparison of the Structure of the Animals w.ch . than & united by the comparison we attain the most certain & certain notions we observed of the same time the reason of many names & called more of those been introduced into practice can further enabled to examine many of the operations w.ch are only to be discovered in living Animals . But it is evident to you that from the gradation in Nature as well as from the Variety of Animals the necessity arises of making a superficial Division of them into Classes, for by this our labour would be either confused, or we would not give a sufficient comprehensive View of the whole .

Hitherto no division has been attempted in the order w.ch might be called . Anatomical . The Writers on the Subject have contented themselves with dividing them

them from external marks and (by far) & all
y^e System of y^e celebrated Linnæus in y^e most
gen^l^y followed I shall begin w^t quina a
very gen^l^ idea of y^e principles on w^ch it
is constructed, referring you for a more
partic^r account to y^r Professor of natural
History.

We find then y^t y^e Animal Kingdom is
divided by Linnæus, as by y^e most accurate
writers in y^e very same manner y^t we in
common discourse (divide) it into Quadru-
peds, or slightest recollection, you know there is a
large (class w^ch is commonly called Quadru-
peds, but we may observe y^t some of y^e
Animals we consider commonly as such,
the whale kind give milk to their young
in y^e same manner as y^e Quadruped, y^r
fore instead of using y^t term we call y^e
first Class

Mammalia, these y^t give suck
to their young, comprehending y^e whale w^ch
y^e Quadruped, or Animal of 4 extremities
in which it is evident y^t Man is in-
cluded — The next class comprehends
y^e

y. Mundo, after y.t we find a Class of animals, after living like y. two first in air, but professing y. power of living longer, than they do, at least in water, so we name y. 3d. Class Amphibia after y.t we add a Class of Fish, wch is y. 4th a vast number of animals, most of them extremely minute remain; wch are divided into Nucleated & naked, which division is made universally, & under one of these 4 Classes, all y. animated beings, may be perfectly well arranged . . . , Sept. 1st, 1st. , main w.t each Class shall be divided & subdivided, or a Dictionary of terms conducted, y.t we may find out readily & indirectly if we have y. description, we may find y. animal, or if we have y. animal, we may find out y.r its description wch case. so y. Class is first split into orders, then y. orders are divided into Genera, or kinds of animals, y. Genus into species, & y. species consists of varieties or to give some general idea of this latter y. first Class of Mammalia or Quadrupeds, you all know y.t a

number

number of animals agree in their nature, & manner of life, y^t Cow, y^t Sheep, & agree al many others, have a general resemblance of these then joined together, we would constitute an Order, or we observe y^t there are many beasts of Prey, which we join together professing swiftness, shape & agency capable of seizing & tearing to pieces y^t prey they agree in a variety of circumstances

We then divide y^t order into Genera y^t Dog & Cat may be referred to y^t order of Ferae; or wild beasts, & y^t Cat kind make one Genus, y^t Dog another, then we observe different kinds of Dogs, or Cats, y^t Lion is one of y^t largest of y^t Cat kind, or we divide y^t Genus into various species. Thus y^t Dog comprehends y^t wolf & y^t Fox, & so y^t species may be divided very fully into varieties, you all know y^t varieties of y^t Dog kind, & w^t respect to y^t varieties, I would observe to you y^t there seems good reason to suppose y^t there are much more distinct, y^n many eminent Naturalists suppose

Goats,

Look into Buffon & you find him giving you a Race, explaining all ye varieties of Dogs, which he deduces from a single kind, varied by soil, climate, & accidental circumst.s, supposing ye various kinds, which have commonly taken notice of, have all proceeded from a few original kinds. Now, I doubt this is a very proper foundation, may I not allege yt Buffon refutes himself by ye very accurate enumeration he gives, of ye variety of Dogs depends upon ye circumstances he supposes, how comes he to find yt there is a certain number only. The number should have been endless, & considering ye succession as he should not have been able to have formed any distinct Race, & yet every person at least in ye same Country can very nearly enumerate all ye Diff.t varieties of ye Dog — So there are more immutable than we are aware of, & are nearly ascertained, that not altogether so as ye Genus itself, & perhaps what we may allege of ye varieties of one genus

of

of Animals, may apply to all without exception. I
wish saying, what I may think probable
of Man, but I am impressed with the idea
from analogy, that the rapture of black &
white is to the ignorance than the original dog
& probably it would be found, that after a
certain period of years, the pipes have entirely
entirely wear out. This seems to be the case
with respect to Dogs, they can generate a
certain number of times, but after that the
worn breed wears out, & hence the varieties
come to be marked so plainly.

Having endeavoured to explain the division
& subdivisions that may be necessary, let us
on what principles these are constructed by
Linnaeus in the different classes, & follow
his order we begin with the

Mammalia. There is no difficulty
of separating one of the orders of the mammalia
from all the rest, the whale kind which
swim in water, by the resemblance of the
Tail & fins, in other respects agreeing
in structure with the Mammalia. The
remainder the Quadrupeds, including man,

are

are divided by Linnæus into 7 different orders from observing ye number & ye figure chiefly of ye fore teeth in ye fore part of either jaw, but calling into assistance ye consideration of ye other teeth. But unluckily Linnæus in describing his 6th order, has laid down a rule, to wch he ought to have paid no kind of attention, y^t, we ought to begin with Man, whenever if we confine our view, to ye Analogy, or morally rational nature, there is no room for precedence, but ye place of order containing man, we may deem most convenient to retain ye division in one manner. By donating from this, you will find a confusion introduced, because man professes accidentally a number of teeth y^t is intermediate. Thus some of ye orders are distinguished by ye want of teeth in ye fore part of either jaw, then fore teeth are given to one jaw then a smaller number, two only, then four, then six, ye shape varying in ye diff^t orders, then there is an Anomalous class comprehending some

animals

Animals, which the Ancients agreeing even yet differ in y. appearance & number of y. teeth. Now if we proceed from y. want of teeth to y. highest number, & second qua-lity, and recollect y. division from teeth well, or if we reverse y. order, but if we break in upon it, we are lost in y. confu-sion, without saying any thing of y. name he has applied not very properly. So he has 3 diff. orders, one called Bestiæ; Anonymi Brutæ, & Mi. Bellua, names so nearly alike, & used in common as to be removed by y. Roman Utriculus, yt. we can't well apply them, may y. term (Bellua) is not applied to y. Elephant, but to y. order comprehending y. same), I shew you examples of y. diffr. orders of Linnæus beginning w.t. man, who has 4 Incisores, & other Animals resembling him called Primates. — Then we have Brutæ comprehending y. Ele-phant, & y. order, where y. teeth are wanting in y. fore part of both jaws. — Then we have different

examples

examples of ye Feræ, where we observe 6 Incisores, but they differing from others in their shape, fitted for laying hold & tearing, 2dly we have examples of ye Bestiæ, wch are all Mammalous Class, agreeing in ye most material circumst.s, but ye number of teeth varying in ye different genera, after ye we have ye Glires, comprehending ye Hare, rabbet &c. which have two fore teeth. 3 Sept ye Pecora, where ye Incisores are wanting in ye upper Jaw. After yt ye Bestiæ, are ye Feræ, where there are 6 Incisores in both ye Jaws, but different from ye Feræ in their being even in ye edge, instead of rising into sharp points. 4 Then if he had begun wt. ye Brutæ, as ye Elephant, where yt are no teeth in either jaw, then ye Pecora, where ye under Jaw is furnished wt teeth, but they are wanting in ye upper, then ye Glires, wch have two fore teeth, then ye animals which have 4 teeth, comprehending man, or ye Primates of Linnæus, then ye Feræ &

Bellua

Bellua) of Linnæus, our recollection) must have
been easy.

The 2d Class, of Birds, is divided into 6 Orders
of Accipitres, Picæ, Anseres, Grallæ, Gallinæ,
Passeres, & distinctions of the orders are drawn
from the beak, & that at first sight, there is
a difficulty in understanding it, it is con-
structed on distinct principles, in so much
that Linnæus has uniformly retained the
division thro various divisions, this he
is abundantly ready to correct any thing
inaccurate.

The 3d Class comprehends the Amphibia, how
this Linnæus has divided into Four orders
These orders are sufficient, admitting the
general principal ones the makers
this division. The first order comprehends the Reptiles pedati, animals that
move more slowly than the quadruped
with feet, & under this we observe com-
prehended the Tortoise, the Frog, the Lizard
for the Draco is but a Lizard with wings
The 2d order comprehends the various
kinds of Serpents. Now these two take

in

all ye Animals yt. by ye Authors have been called Amphibious. But Linnæus has added a 2d order, ye Nantes pinnati. How far he has done so properly can only be discovered when ye anatomy is known. The Scate is reckoned in ye number, or in general this order comprehends, what Linnæus Authors have called cartilaginous fishes, ye flesh of wch is supported by Cartilage instead of bone.

The Fish is ye 11th Class of Linnæus, he has removed from it ye Cartilag: fishes, & ye rest are divided by him into 11 orders, from ye situation of ye pectoral fins, or as he calls them ye pinnæ pectorales. The fish moves chiefly by ye force of its tail, but it has ye fins standing out transversely, by means of wch it turns its body in diff: directions. Others again are added to him, wch it swims sailing side ways, as on ye back or belly. Now these on ye belly are its feet, ye fish rests upon them, spreading them out broad, &c. Linnæus attends to ye situation of ye

Ventral

ventral w.t respect to y.t pectoral, & if they are further towards than y.t pectoral, he calls y.t order Jugulares, but if they are under y.t pectoral he names them Thoracici, & if they are towards y.t Belly Abdominales, & he has constituted Ordens, then he finds another order, where y.t feet or ventral fins are wanting, & he calls y.t order Apodes, without feet, & 5.th order still remains, where y.t is a want of y.t flaps w.t cover y.t gills of y.t animal, & he calls these Branchiostegi. Now there is some difficulty in reducing a fish even to the proper order, for it is difficult to know how y.t ventral fins are placed w.t respect to y.t pectoral, so y.t division by Artedi is more correct.

Class Artedi

Pisces
- Cauda perpendiculari pinnarum radijs
  - ossea branchijs
    - operculata pinnis
      - 1 Malacopterygij
      - 2 Acanthopterygij
      - 3 Branchiostegi
    - occultata
      - 4 Chondropterygij
  - cartilaginea
- Cauda horizontali
  - 5 Plagiuri

We now proceed to y.t smaller Animals, y.t Insects & worms. Linnæus divides y.t in-

sects

insects into orders, chiefly from attention to their wings; if they want wings, he throws them into one order of apterа, wch makes his task (might as well have begun wt it). Then he distinguishes ye winged insects from each other by ye number of ye wings, by ye covering of them, or by ye appearance. There are many insects wch fly, & yet when they are creeping they walk on ye feet, & we do not observe in yt they have wings, because ye wings are concealed by a firm sheath, hence there is room for ye forming ye order of Coleoptera or wings sheathed. But in many ye sheath is incomplete, or there are double wings for ye sheath varies in some measure ye purpose of ye substance wherewith & hence ye next order is called Hemiptera, tera, but it needs some additional word to give an explanation. , , Do you know if ye wing of a Butterfly be touched a powdery matter separates from it Examining this wt glasses, we find scales laid over each other in a gen: way, representing ye feather of ye wing

of a Bird, hence Linnaeus comprehends such Insects, under an Order called Lepidoptera, wings covered with scales. Neither is the unique of many Insects, there are threads running across, for the support of the wing, to give it regular form nose, these therefore Linnaeus has called, Neuropteria. But in many Insects the wing is membranous, more resembling a membrane, to be more of the term of Hymenopteria, of membranous wings. Now so far all the insects comprehended under these orders have 4 wings, considering the shells as serving somewhat the purpose of wings. But there are a considerable number of the Fly with two wings only, without sheaths covering them, so these are called Dipteria.

The class of worms still remains, these are divided in the following manner, Animals have a sack, or receptacle for receiving the food within the body. Now in many worms, the body represents the shape of the sack, but other worms, tho equally soft in texture, have an muscular shape, have limbs or parts projecting from them. We find room then for dividing the soft worms

worms, & Mollusca, into two orders, & first is called Intestina, resembling a part cut off from the Intestinal Canal of a larger Animal, & are make a 2d. of Mollusca testacea instructive meaning merely any thing proceeding from a body, as horns in a Snail. Next is a large order of worms, in wch. the whole is covered by a shell, & mollusca testacea, & may subdivided this order from the No. of its shells or its shape, into Animalcula, & multivalves in some again the shell is spiral, while in others it is of a different shape.

But still a very great number remain uncertain and not reduced to method. Some of them have very regular figures almost like the horns of a shell, & regular cells in every part. How when these are examined in the sea, we find connected with them living animals. See Ellis very curious work on Coral & Coralines. All these subdivisions Linnaeus instituted his orders, he calls first Litophyta, & 2d. Zoophyta. Now by first, & plants, he understands a vulvolance, con-

sisted

structed by Animals, nearly in ye way ye wasp is constructed by Bees, but instead of splendency this idea of ye Hydra, she conceives even where they turn ye recumbent stem spade it's used in vain, & grows into ye appearance of a plant, but when it comes to flower, & ye flowers are animated bodies, & how far ye idea is to be admitted, I shall consider when I come to speak of ye Anatomy of ye wasp. It may be worth while to show you here figures of ye common Polypus, taken from ye Philosophical Transactions. The diverse ye manner in wch it propagates, ye a number of heads proceed from one body. But besides ye spontaneous propagation in this manner, it is a fact well known, yt we may divide it into any number of parts, & tho it has a head & tail different in appearance from each other, ye head an organized body very curious, wt a number of subtle serpentine head of its prey, like ye navel of ye polypus plant, yet all ye parts of ye animal are rendered, if we cut it transversely ye head forms a tail, & ye tail gets a

head

hair, or we may cut it longitudinally, I have
spoke formerly of y. Tænia, & doubted whether
it was possessed of such a power of adding to
y. number of its joints. I shew you a most
pernicious Animal y. Lizard lives in y. alimen-
tal of Horses.

By dividing Animals into Classes, Orders
& Genera, we are enabled by selecting a few
examples, to give a general idea of y. struc-
ture of y. whole, & following y. order I have
mentioned, I begin w.t y. Mammalia, &
that a contrary method had been observed
by Authors, we would have done wr. because
we have already fully examined y. human
body, one of y.e Class. A Naturalist perhaps
ought to take a very diff.t method, or an
Anatomist pursuing y. study in a very
different way, beginning w.t y. most
simple structure, he would gradually ad-
vance, nearly inverting y. order of Linnæus
Now as we are fully acquainted w.t y. hu-
man body, there is room only here for
a few cursory remarks, especially as I
should detaining you, by shewing models

off

of more curiously, unless we can make some application of them, or yt we can throw some farther light on ye human structure or Physiology by attending to them.

In ye first Class, ye chief things to be certain we will be ye digestion of ye animal, for they agree in every essential operation, in ye manner of taking in ye substance nourisht circulating it, or ye operation of ye menstruum but in ye digestion, there is room for a great deal further enquiry. That man is by nature intended for a mixture of ye vegetable & Animal food, appears from ye structure, whether we attend to ye organs preparing, or to those receiving ye food, or to ye animals yt agree in structure, or to ye practice of all nations. But other Animals live in a more equable manner using only one particular kind of food, many feed not only on Vegetables alone but on certain parts of vegetables, ye foliage chiefly, whilst others never taste it, unless when compelled, or a habit contrary to nature, has been introduced. So we

we would compare y^e herbivorous & carnivorous
animals w^t man, & we shall take two orders
as remote as possible, y^e Pecora of Linnæus
& y^e Feræ, w^e joined to man, serve to illus-
trate y^e manner of Ingestion in y^e whole tribe
Examining y^e Pecora, we find y^e teeth al-
together wanting in y^e upper jaw before, in y^e
under jaw we find them thick set & sharp
tearing deeper into y^e mouth, y^e Canini
ni are wanting, y^e molares are numerous
have a number of sharp points & edges, &
y^e naturel disposed in perpendic^r plates.
If next we apply y^e fingers to y^e palate
& to y^e tongue & throat, we discover a numb-
ber of transverse rugæ, w^t y^e points turned
backwards, so y^t we can upon y^e whole
determine from y^e structure y^e kind of
food, y^e animal is fitted for; y^e upper jaw
is fitted for laying hold of foliage or grass
& by a slight toss of y^e head, y^e grass is
readily cut away from its root. The ma-
lares are evidently intended for a great
mastic^n such as y^e foliage requires
& y^e points are so disposed, as to twist it

it back into ye throat. Examining ye Dog again we find ye fore teeth in both jaws remarkably sharp, & of them, & behind them very long tusks from wch our teeth are named Canine. Further back we find a number of very strong square sharp'd in ye edges, made for cutting & tearing but then ye Crust of ye enamel is upon ye sur face, it covers ye whole surface, & is not made for such constant use, as ye former order, wch we determine from moving ye teeth, yt. he is made for ye cutting of flesh & he is capable by ye strength of ye teeth, & muscles of ye jaws to break ye bones of ye animals. In this respect ye division of Linnæus, agrees in some measure ye structure not only of Anatomy, but of musicians, by putting out ye amygdalæ, wch feed on vegetables wch we may take wt ye greatest safety. When we compare them wt those Linnæus, it is evident yt he sleeps in ye trees on them, & yt upon ye whole he approaches most to ye carnivorous animal we find his fore teeth sharp for cutting that they are not so well calculated for ye

y. having ye prices. not in y. masticy. then y.
long tibiæ in miniature, & curl. molares are
made for grinding, they are sufficiy fitted for
grinding Herbs, but they differ from those of
y. Lyr. in being much fuller, & they are equally
calculated for grinding, particly y. more prospe-
rous parts of vegt.; so we would conclude y. man
was designed for a mixed animal. We trace
y. food further down into y. throat; & here
we find a circumstance or two y. merit
attention. In y. Quadruped y. uvula is
wanting, in man it seems to be formed
on acct. of his erect posture, to prevent
y. food from falling by its weight down
into y. lungs, it serves as a monitor, y.
when y. below is hurt. back, y. throat may
be irritated, & y. glottis may contract to
prevent it from entering, so y. uvula
is more sensible than any part of y. ve-
lum pendulum palati. Now in y.
horizontal posture of y. animals, y.
danger of this is not so great, But
in y. Quadrupeds we find, y. y. epi-
glottis has a muscle for raising it,

ou

as they swallow y. food more voraciously, & from
its nature, it is more apt to stick, & entangle
y. ciliæ, while man can give a resistance
wt. y. finger, if a piece of meat stays in y
gullet, he can reach it wt. y. fore finger.

Yt pursuing y. food into y. stomach, we
shall find, in coming nearer to ye, the
structure of y. tunics more in the carni-
verous Animal. Thave y. stomach of a dog
wch is large in proportion to y. animal, &
is more evidently muscular than in man,
Yt in stead y. intestinal tube, which is
laid down as in man at y. upper end for
supporting y. stomach, then it floats loose
makes a large turn very different from y.
human, & is turnd back again to be tied
pretty closely to y. spine. So in y. horizon-
tal posture, y. food must accend contrary
to its weight, & in our erect posture some
what of y. same kind happens. Stomach
evidently intended to retain y. food in y.
Duodenum, as undergoing particl. changes
in y. organ, the lowest y. gut thicker
than above, & yt it possesses a power

of

y^e contracting very considerably, y^e Intestinum ca
also much shorter than in man, whil in
a Sheep &c^a it is vastly longer, & y^e coats are
less muscular than in Man. Where y^e small
Intestine ends in y^e Colon, we find a long Intes-
tinum Cæcum, & in some Animals this makes a vast
number of very intricate turns, in y^e Sus
it makes many spirals. Tho y^e great gut
makes a short turn in y^e Carnivorous Ani
mal, y^e Sigmoid flexure is wanting. Further
y^e small & great joint together, there is no
very accurate value, so we are not to assert
what we observe on inspecting an Intestine y^e
Intest^e of a Dog &c^a to y^e human body.
In y^e whole therefore, we observe y^t y^e alim^y
canal is much shorter, but more mu
cular than in man & y^t y^e stomach is
more capacious, w^ch is rather perhaps from
a necessity of nature, y^e carnivorous Ani^s
having not always y^e food at hand, y^e
thicker coats of y^e canal, seem to be es-
pecially intended for y^e more accurate
expulsion of y^e contents, & we find here
a vast deal of slimy substance, to defend
it

it against ye pubescent nature of ye food, as wd as against ye sharp rubst. such Animals take down. The assisting Chylopoetic viscera of both kinds have a similar structure, & ye whole are covered wt a long expanded omentum, wch reaches to ye pelvis, while in ye human body it scarcely reaches ye umbilicus, wch clearly points out ye intended difference of posture. We can take out ye pancreas, wt more ease in ye dog than in man, tho it shows there was room for Delgrease apperens. The liver is only divided into a greater number of lobes, on account of ye slight motion of ye Animal, & ye lobe in wch ye Gall bladder is lodged, sends as many branches to ye hepatic duct, as any of ye oth lobes, so yt in ye Quadruped hepatic Cystic duct are kindly wanting, & ye bile comes directly from ye hepatic duct by regurgitation thro ye Cystic. Now so much of ye alimy Canal & in general of ye assisting Chylopoetic viscera of ye quadruped —

Let us next take a view of ye structure of ye Herbivorous Animal, as yt

y.ᵉ 1.ˢᵗ y.ᵈ Ruys. The muscular structure of
Oesophagus is very evident, & following y.ᵉ tube
we find y.ᵗ it enters just where the cardia join
togeth.ʳ, or the stomachic mouth, y.ᵉ largest part
in y.ᵉ left side, & it has many curious structures
a number of processes m.ᵗ and rounded at y.ᵉ top,
& m.ᵗ increase y.ᵉ surface of it greatly. We call
it y.ᵉ Ventricle or Ventriculus, or ingluvies, & it
may be compared to y.ᵉ cross of birds. The 2.ᵈ
stomach has a still more curious structure
resembling very much a section of a honey comb
& purchase y.ᵉ best name for it is y.ᵉ Honey comb
second stomach. This leads us to a 3.ᵈ stomach
in w.ᶜʰ we find a N.ᵒ of beautiful processes, &
on every one of them a number of papillæ
or we find a N.ᵒ of plica. Hence this is best
named y.ᵉ 3.ᵈ stomach or Many plica. Now
y.ᵉ last stomach much more nearly than
any of y.ᵉ rest resembles our own, it has a
number of valvulæ conniventes disposed
longitudinally & w.ᶜʰ are more remarkable here
than in man. When this ends in y.ᵉ pylorus
& we find half a canal leading thro y.ᵉ
2.ᵈ into y.ᵉ 3.ᵈ, & a similar passage lea-

ding

ving Meat ye 2d into ye 3d directly into ye 4th
how you will recollect, what I probably all of
you have observed, yt a Cow or Sheep, after
feeding a certain time, lies down, & appears
still to be eating, or chewing, & you observe a
ball thrown alternately upwards & downwards
in ye throat, ye creature makes an effort, then
ye ball rises, then chewing a certain time
ye ball is swallowed, & ye motion is so rapid
yt ye eye scarcely follows ye ball. The animal
then takes in a fresh provision, receives
it into ye first stomach, & having lien a
certain time, it is brot from ye first sto-
mach up into ye mouth, & we must sup
pose yt it returns, not into ye same, but
into ye 2d stomach, from ye second into
ye 3d, & from yt into ye 4th. When drink
is taken, we do not observe yt ye animal
receives ye drink into first stomach, but
it to ye mouth & so back again, but taking
a large qty, it fills ye first stomach
& makes it pass by degrees into ye rest
& at last does ye same wt milk, nay it
may run directly from ye Oesophagus to
Valve

along y^e gutter into y^e 4^th stomach. Now we reeal
once y^e intention of nature in bestowing so many
stomachs, y^t it is to enable y^e Animal to con
vert y^e most gross parts of vegetables into alim^t
y^t nothing may be lost, & you know y^t y^e dung
of a horse, w^ch does not nourish, is a much
richer manure than y^e dung of a cow, y^e nutri
tious part being more thoroughly taken from
it; But we apply this still farther in Phy-
siology, & we have y^e clearest proof of a living
principle superior to mean Experience, operating
upon y^e active parts of animals. We see y^e
stomach acting in various ways, according
to y^e utility, w^ch out y^e Animal knowing
more of its inward parts than we do.
Hence we evidently y^t every stomach possesses
a different organization. Now y^e conclusion
we (we draw) here is, y^t we are by no means
to conceive y^t y^e liquors we receive from
y^e mouth & stomach, serve merely for
dilution, but y^t they act as. Menstrua
for if a greater extension of surface only
were necessary, y^e same structure w^ch
serves in all, but every stomach performs
by

by ye liquor as a menstruum, a certain operation
& 15 years ago I made some experiments, w.ch put
him matter in ye clearest light. after keeping
a Leg w.th out food 30 hours, I gave him piece
of ye thigh bone of a sheep, wrapped in flesh
having weighed them first, & killing him ye
next day; there was not ye smallest mark
of ye most part of them to be found, so ye action
of ye stomach is much more complex, than
it is generally imagined &, Mr. John Hunter
has thrown farther light upon ye subject
in ye Phil: Tranvactions.

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We have observed y^t. y^e. Alimy Canal of y^e. Herbivorous Animal. is much longer than y^t. of y^e. Carnivorous, so further changes need to be made to render y^e. food fit to y^e. circulation of y^e. animal & ease to be received, & y^e. changes happening in y^e. last part of y^e. canal, and necessary for y^e. crude nature of y^e. alim^t. in y^e. upper end, & we are far from yet knowing y^e. power of y^e. Intest: crassum. In y^e. human body, I am much disposed to consider it chiefly as an organ preparing slimy matter, but in many of y^e. quadrupeds, especially those living solely on herbs, we find it of a very great size, nearly equal to y^e. diameter of y^e. stomach itself, in y^e. hat it is to y^e. full longer than y^e. stomach, so a very great deal still remains in every part of y^e. process of digestion, to be discovered by plain experiments by opening Animals at different times, after we have given them food, y^e. nature of w^ch is known to us ——6

The food in latten in here as in man & conducted thro' y^e. lacteals into y^e. mesenteric glands, & y^e. only Lacunæ here is y^e. veins

wch glands are collected together, near ye root of ye meventery, wch is more transparent than ye rest, ye last following ye course of ye principal vessels. Now this circumstance led ye inventor of ye lacteal vessels into ye mistake of supposing yt they terminated in ye Pancreas, hence ye term of ye Pancreas Asellii, by wch we are to understand ye Meventeric glands sticking together in one cluster. After ye lacteals have passed thro these glands, they pass upwards in ye usual manner, till ye new ingredient get into ye circulating mass, tho after it gets there, we can still see it floating upon ye surface of blood for some time, so yt authors who have supposed yt ye lungs & ye organs contribute much to ye mixture of ye Chyle wt ye blood, tho proceeding on conjecture, have really proposed true opinions — Next we find ye same gent structure of ye heart & of ye lungs, only ye heart is placed straight almost in ye Thorax, wt ye apex downwards & ye mediastinum having to joining near to ye septum medium of ye heart, & hence it is properly divided into right & left auricle

Auricle & Ventricle, whereas in ye human body by ye Vessel being turned over, there come to be improper names, as we find ye one right to more anterior, & ye left more posterior &c. Tho' ye heart is at ye distance from ye Diaphragm, insteed of resting on ye middle, & tendinous part of it, ye oblong shape of ye animal a large motion of ye diaphragm being necessary to give a sufficient enlargement of ye Thorax, to which ye tendinous p. m. ye Mediastinum is connected, how ye principal motion, or ye whole of it pushes down ye Abdominal viscera in an uniform way, the lungs of ye Animal are divided into a greater number of lobes to allow ye parts to accomodate themselves to ye shape of ye Thorax & ye greater motion performed especially in bending its spine. And we may have correct an error ye is apt to mislead one. When ye lungs of ye human body are taken out & we attempt to fill them w.t air & to keep them distended, it escapes very readily hence a notion has prevailed, ye air passes thro holes to get between them & ye side, & in some Classes of

Anim.ls

Animals, as y^e bird, such holes can be (demonstrated) w^th y^e utmost ease, & on opening y^e Thorax it has been alledged y^t y^e lungs and not found but y^t a blast of air is perceived out immediately. Morgagni has proposed an opinion of y^t sort, & Hamberger, a Physician of Germany, has pretended to give an Argumentum Crucis, That if you open one side of y^e Thorax of a Quadruped, & expand y^e Mediastinum, in w^ch there is no perforation you can perceive y^e air between y^e mediastinum, & y^e lungs of y^e opposite side. But y^e fact is y^t y^e lower part of y^e mediastinum of y^e Quadruped is undoubtedly there is an opening behind y^e vena cava w^ch receives a small lobe of y^e lungs into y^e right side, so on opening y^e Thorax, y^e lobe w^th y^e other collapse, & we seem to see a bulla of air on y^e opposite side, but it is in reality on y^e same side, & if we open y^e left side instead of y^e right, there is no such appearance. Besides we constantly find y^e lungs contiguous to y^e pleura, & when we open y^e Thorax

under

under water, not a bulla of air appears, unless ye lungs are wounded. 6 From ye length of ye trachea in ye Quadruped, Brunchotomy comes to be an easy operation, so we can choose our place, avoiding ye Thyroid gland, & further ye Thyroid gland is here divided into two lobes or rather there are two Thyroid glands. 7 Air there in proportion to ye animal, are vastly smaller than in ye human body & this circumstance renders more doubtful any suspicion formed about ye gland, of its being necessary to ye formation of ye principal parts of ye general mass, we may be more inclined to suppose, yt it serves some local office, than yt it contributes to ye good of ye whole. 8

Having seen yt ye gen[l] circulation in ye same, as in man, we would follow ye arteries from ye heart outwards, & here we find ye reason of ye names, aorta ascendens & descendens, ye aorta in some animals dividing nearly into two parts, as in ye Cow kind. Following ye circulation we may next observe yt ye animal has

nearly

nearly ye same operation as we have. We find ye kidneys situated in a similar way, but rounder than in Man, where ye weight of ye other bowels, seems to flatten ye kidneys as in ye human Foetus, it is rounder than in ye adult, & composed of 2 glandes, i.e. of lobes, wch by age & time are compacted together, we find here ye cortical & medullary substance, more evidently separated than in man, but ye same general structure takes place, In ye carnivorous Animal ye bladder is thicker & more muscular, than in ye Herbivorous, & it is seldom much distended, in wch case when ye animal is confined, ye muscular structure serving for a quick, & accurate expulsion. Now this proves yt ye acrimony of ye liquors, continues their life, & yt ye parts are not merely affected by their distension, So Dr Whyte supposed yt ye blood, by ye particular nature of it, might solicit ye heart to contract as much as by its distension, wch is controverted but not in good grounds, as ye urine when acrid in ye morning, solicits more

more to discharge, than if the same quantity (does, when
it is of a more watery, nature, then if the same
passes over the whole of the bladder, as from
the horizontal situation), the urine gravitates
towards the diaphragm, while in the other it is
merely thrown over the bladder, to prevent the
want of the other humours, from hearing upon
it. This may explain why the high operation
of Lithotomy, was so long in being
shot of. Theory not leading to this operation
whilst the human structure was imperfectly
known.

The operation by the lungs, is nearly the same
here, as in the, so also that by the urine, there
is however a circumstance of some great
curiosity, to take place particularly in the dog
kind. That they perspire more than
from the particles smell, as all animals
have, & that one dog can readily trace another
by the smell, but it is impossible
to make a dog vocal, unless if the diseases
changes about that of salivation from his
mouth, so this leads to doubt, whether
the perspiration & vocal be discharged from
the

yt. vane w.ſocks, or if we are to conceive y.m as a secretion, presumed in a way (diſſer.t manner & w.t (different effects, Further it will be found yt. yt. Dog kind alone are liable to yt. rabies, w.ch we commonly name Canine, Now whether are we to suppose yt. these two circumst.s are connected, yt. yt. animal is disposed to yt. disease, from yt. want of this discharge thro' yt. skin. It has been alledged, in proof of this, yt. those persons in yt. warm climates, who sweat w.t yt. most difficulty are most exposed to yt. most dangerous fevers, & supposing yt. rabies to have been communic.d by a Dog to two ppl.s to a Dog, & supposed that probably yt. bite of yt. dog, w.d be yt. most dangerous because of yt. nat.l determination, w.ch yt. acumen.s parts of yt. mass, seem to have to yt. salivary organs.

We are next led to yt. N.S. & observe yt. yt. number of ways, in w.ch impression is made, is yt. same as in man & feeling excepted, yt. sens.s seem to be more acute, yt. taste, smell, hearing

seeing in gen.l, or some individuals possessed of all of these powers, in a higher degree than we do. The use of their doing so is abundantly evident, to enable them to find their prey readily, to direct their motions, & if they want the power of making the experiment, to judge of the safety of entering the station. Any one can go further than the final cause, we seem to terminate the structure on y.e first appendage. In y.e mouth of y.e Quadruped, there is a number of papillæ disposed on y.e inner side of y.e cheek, as well as y.e tongue, so y.t y.e surface of y.e organ of taste is more extended. In y.e hand, in a still greater degree, we observe y.e same thing, in a Chicken or Dog, there is a very curious connection of y.e bones, from w.ch we understand y.e name of osseæ ossificatæ. Now without saying, what ought to have been, y.t every part of y.e surface of either organ, has a more acute feeling by its nerves, y.e extent of y.e organ is greater y.e impressions is multiplied, & this has nearly y.e same effect, as y.e increasing y.

y. sensibility of y. nerves, just as we smell more accurately w^t two nostrils, & see more distinctly w^t two eyes. In like manner if quadruped turn y. cone of his ear directly towards y. sounding body, & receives y. impression w^t both ears at y. same time, so if you observe a thing of horses in y. evening, y. sternmost hastie ears set forwards, y. next hind most towards their companions, but y. hindmost outwardes, & turn his backwardes, & what we observe of y. external muscles, we would apply to y. internal, y. these are joined to y. particular action w^c gives y. chain of bones y. necessary tension in y. eye to there is a large muscle for drawing it more readily on y. object, & we find always membrana nictitans. You will observe y. minutes is only able by this to separate y. upper from y. nether. You have this in miniature, so y. distinction paid him. Besides y. pupil of y. quadruped is accommodated to y. objects, he is in quest of such as feed on grass, take in a larger field & see it more exactly than y. figure of y. Eye, while y. cat kind, y. seeks their

prey

prey, changing its situation from y. ground to a
bee perhaps, have its pupil perpendicular. Nay
w.t less motion than we, they shut y. pupil more
universally, by its being dilated down in two pounds
so if you expose y. eye shut to y. light, you
can discover a prodigious motion of y. pupil
Besides they are enabled to vast smaller qtys of
light from a brighter colour found in y. bottom
of y. eye, w.ch throws back y. rays of light w.t
considerable force, & must impress y. nerve
more strongly. . Nay they exercise their muscles
w.t more strength & steadiness than we do, as
y. Rays we can possibly a much greater space
of ground, w.t out fatigue than we do, a
Revolution would accrue hereupon. Were we
to suppose y. Brain, w.ch we suppose lunges
to serve merely for sense & sensation &
apprehend we must suppose a pneumatical
farther, w.t out our being able to conceive
clearly what we mean, but y. brain of
y. animal, w y. medium between y. body
& y.e living part, & soy.t power than those
of sense & motion, and exercised thro it, in
a manner we will never be able to come
to know

produced by y^e act of Sucking, y^e power of y^e mind and Will commanded, modified & extended.

We would next consider y^e manner in w^ch y^e species can be continued, beginning w^th y^e male Organs. In y^e Testicles Seminal Vessels are wanting, y^e reason of this Death conjecture but a consequence of this y^t y^e Copulation in Species actime must be given for y^e semen to be carried round from y^e Testicle thro' y^e Ducts. Now this shews us, y^t there is some power at one time determining y^e motion, much more than at any y^e, & that y^e uniform impulse of y^e Circulation, or vis a tergo, y^e enemata muscle may grasp y^e Testicle, but y^e tubes themselves, must also possess y^e same power, may swelling of y^e tubes, have been true on from swellings of y^e mind She means by w^ch y^e Copulation in Indeed Medicus, is very simple, y^e animal has a 2^d corpus cavernosum at y^e root of y^e glans penis, y^t is received w^th in y^e vagina & y^e corpus cavernosum of y^e Vagina is larger than in y^e animals, hence y^e semen

is

is retained; & as when they turn' aucrse to each
other; y. urethra is in danger of being twisted
we find a bone in y. penis, w.ch a surgeon to con-
duct y. semen, & whenever we find this bone
we may conclude y.t y. penis semina[l] con-
duct wanting. Where y. processe of y. peritonæ
w.ch is found in y. human body in y. fœtus
state; remains ever after; viz.t there is a com-
mun.l communicat.n between y. abdomen &
vaginal coat of y. testicle, & from y. we
can understand y. manner in w.ch y.t kind
of Hernia, w.ch has been called congenita,
forms, where y. bowels cover y. testicle.
The shutting of this processe in man; evid.ly
shows y.t y. erect posture is intended, &
as y. quadruped semel.r rises erect, & there
is a degree of danger, to prevent.r y.t a
very curious valve is found, w.ch consists
of a fatty substance, & is not exhausted
however lean y. animal may be.

Let us next attend to y. appearance
of y. gravid uterus, as y.t of y. sheep.
We first observe y. change in y. ovari-
um, y. Corpus luteum. In y. multipa-
rous

now quadruped; y. uterus has cornua, in wch
fœtus are lodged, as well as in y. body of it.
We perceive a vast number of placentulæ, &
glandes corresponding to them in y. uterus before
conception. We find next to y. uterus, y. chorion
connected wth it y. placentula, y. processes of
wch enter into y. hollows of y. glandula,
from y. glandula a milky like substance may
be squeezed out, we also find y. amnios buy
filled wth liquor, y. urine of y. animal, & what
has been called allantois, it is thin & totally
without vessels, & there is often in it a small
solid substance, a sediment of y. urine,
We next come to y. Amnios, wch contains y.
liquor in wch y. fœtus swims. In persons
attending to this structure, we must infer
y. y. uterus contributes much to y. formation
of y. placentula, for it is scarcely
to be imagined y. a certain definited num-
ber of them tumbling about in y. uterus
would be so accurately applied to it, & in
y. human body, y. surface of y. ovum
is at first pretty uniform, & every part
of it is equally calculated for forming y.
placenta

placenta, & manner of conception, of & uterus of & quadruped to & fœtus, is very different from what takes place in & human body, we find a milky liquor in & glandes, whereas in blood of & fœtus is contained & fœtus in & human body entering into & placenta, so there is a real difference in & manner of & nutrition, that we could prove therefrom & there was no communication by circulating vessels between & fœtus of & quadruped & & mother, yet can proof fail be far from applying to & human body. And we are more confirmed in & from finding an allantois containing & urine in quadrupeds, & in birds. In & human body there is unequal necessity for & fœtus getting rid of & urine, yet nothing of it is to be found in & liquor Amnii; nay & more evidently filicious parts, must pass off into & mother, kept in & human subject, we cannot demonstrate vessels in & amnios, some are also to be determined whereas & liquor amnii comes, some suppose, & it is from & uterus, but in & quadruped, no uterus vessels in & amnios, we look to little hands

&

& are derived from y^e umbilical cord, so this liquor
is a question by y^e Jews doctors, y^e question there
fore w^ch respects y^e nourishment of y^e foetus
whether it be by y^e umbilical cord, or by what
it swallows, vanishes. all is originally derived
from y^e cord; & y^e cord cannot be wanting, it is
essential to y^e life of y^e animal, & only a reser
ved question remains, whether y^e foetus
swallows y^e liquor amnij. This is a very
improbable opinion, & yet y^e latest. Hemmings
found hairs in y^e stomachs of calves, & he could
only discover these, after y^e calf had got hairs
in y^e mouth. But admitting y^e fact, it does
not alter our ideas, w^ch respect to y^e nourish
ment of y^e foetus.

Tis in you y^t y^e lungs of a foetus, unfit
in water, are readily do y^e touch, & tho at
most as solid, & are of a darker colour.
whereas after y^e air is thrown in, they
swim. So by this circumstance we judge
whether children are still born, but we
ought to be careful, y^t nothing have happe
ned, y^t could introduce air into y^e lungs
as y^e blowing it in by artificious persons

or

on ito being drawn in by an unguarded motion of
y. child, or y. y. parts are not grown pubid, when
they may become emphysematous; uniem, &
if y. lungs with have y. dark colour, we ought
to conclude y. y. child has not breathed.

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The next Class of Animals, y.
Birds, agree w.t y. former in material re-
spects, for like il, we find ye humilion, y
bodies covered y. hairs, by y. principal
outer mark of distinction; so y. Beasts, covered
y both. The material inward operations
and carried on nearly in like manner by
by y. principal difference w.t be found in
y. manner of generating, y. they are at
viviparous, i.e. y. nourishment is prepared
for y. young, before we distinguish it, & y.
young increased, w.t out any connexion w.t
y. mother, when we view, y. outward form
of a Bird, stripped of ito feathers, ito epine-
milion seem ill placed for y. balancing
of ito body, y. legs seem to be too far back
but then y. animal carries ito body ob-
liquely; without y. leg, but w.t is in nearly

y.

y. feet, makes a great angle forwards, so y. bone
in wch y. muscle is moved y. common centre of
gravity. The wings in like manner seem to
be placed too far forwards, but then y. weight
of y. animal in flying is in a great measure
supported by y. tail, that is chiefly used for y.
direction of y. flight, allowing more immediately
to y. structure of y. extremity, and lessened y. y.
muscles, wch manage y. wing, and wellgoing
& hence all arise, we see y. vanity of imagining
y. man can by any contrivance, be made to
support his body in y. air, for either y. force
is wanting, or if y. machine power
and called in, & proper apparatus contri-
ved for shifting y. air, y. quantity of. when
a Bird flies he uses his wings, as we do
y. arms of a Boat, & as y. long feathers of
y. wing and stretched backwards y. body
is much hollow supported, than it appears
to be, then y. tail is spread out, y. whole
it serves chiefly y. purpose of rudder
it at y. same time makes a resistance
& supports y. posterior part of y. animal
the structure of y. foot, or what is called
y.

y. leg is likewise simple, but (collectively (except
for its principal office), for when you clap y.
foot upon y. leg, y. toes are drawn asunder
with y. circumference of a small circle, & y.
extension of y. toes are so short, y. in making
this motion, they and two y. fullstocked, soon
drawing y. foot towards y. body in water
y. breadth is greatly lessened, but in pushing y.
foot backwards, by means of y. web w. is
extended between y. toes in y. water soon, y.
water is pushed w. great force, if aquatick
Bird of prey, endeavours to lay hold of any y.
Animal, when he (descends by clapping in
y. wings, he spreads out his feet, & sets upon
any y. Talons flip on y. prey, y. weight of y.
Animal shuts y. toes strongly upon it. In
like manner Birds of y. earth, seek
insects upon y. surface of y. earth, they spread
out y. feet & throw a great deal of it off at
one shake. I shall here make y. experim.
formerly mentioned, of imitating y. voice
of y. animal, by blowing into y. wind pipe
even after we have made a hole in y.
neck, or intercepted y. communica.n 6. two
y.

y. larynx & y. trachea, I blew in air, & soon found it out again, we have a name, nearly resembling y.t of y. animal, when alive, y. cause of this comes to be examined in y. course of y. dissection, wch we begin wth observing.

The Organs of Digestion, for the animal is intended by nature to feed nearly in y. way we do, upon y. more prepared parts of sugt. wth a mixture of animal food, yet from y. want of teeth you would expect some further assistance - In y. cavity of y. mouth, we find salivy organs, y. inferior maxillary glands but we want a covering to y. buccina, & there is merely a large rima leading into y. nose quite y. length, because from y. want of teeth, y. subst.e y. animal takes in, is in little danger of falling into either. Going farther back, there is a very wide Gullet y.t. glands of it, are much more wid.t than in man, a mark y.t of digestion seems to be poured out, from y. pharynx, where led down y. oesophagus, wch is extensive large, because y. food passes without mastication downwards. We are led to y.

y. Cross of Santo, wch is placed on y. right side of
y. Wind pipe, at y. lower part of y. neck; in y.
Cross, we find Ligues produced out in very great
plenty. From y. Cross, y. passage lead
to y. stomach, but wth out any finding a new
partic.r Gutter for conducting y. Food directly
downwards, that y. Drink may perhaps pass
directly into y. other stomach, & thus pass into
y. 3.d Gut. In y. 2.d stomach we perceive du-
rectly a number of suffices coming at y. sides
large, there is no clear proof to be given of y.
Follicles, then in this part, large containing
a Liquor, & discharging it selves at
suffice in y. side of y. Gut. In y. carnivor.
Bird, y. 3.d stomach resembles y.t in y.
Dog, but in y. Granivorous, it consists of
very thick muscles, joined together by strong
tendons, & y. whole is lined by a very thick
membrane, wch tears off very easily. Soy.
description by Pliny is a very distinct one
y. ventriculus callosus, carnosusque.
From this stomach, y. Duodenum comes
out in y. ordinary way. Next to judge of
y. effects of these new parts in Digestion
we

we must slit them open, & examine their contents
(if any animal has got grain enline), it remains
entire in y. first stomach, y. 2d, & 3d
stomach, I suppose
that y. 2d. it seems chiefly to receive mucous
matter, in y. 3d we find y. grain broke down
& there is mixed with it, many of y. very hardest
pebbles, may without these, if you feed them on
grain unbruised, they are not sufficiently mas-
ticated, it is requisite therefore y. 3d stomach
supplies y. place of teeth, y. by it y. food is
triturated, & y. effect of it is powerful beyond
what we could expect. Reaumur found a
Cylinder of Iron, w.ch he cut into two equal
pieces, & threw one of them to a large bird
w.ch it swallowed down, & examining y.
stomach soon afterwards, he found y. y.
Cylinder was squeezed flat, he then laid
weights upon y. other half, & he found y.
it required y. weight of 130 lb & upwards
to have y. same effect. Now y. force of
y. stomach was y. double of this, Reaumur
commits a mistake, because it made and
only y. pressure, but y. resistance, y. food
lies in to be drawn by force in y. two
stomach

stomach, but ye compleate digestion of it, ye solution, & ye rendering it like to ye animal is performed by all ye stomache, concurring in ye perfection, not yet accordeing to opinion of some ye stomach ye food descends thro a very long tract of Intestines in ye grandium wherein we observe confirmed what I formerly mentioned respecting ye duodenum, yt in all animals ye food is purposely retained in ye part of ye canal, after ye bile & liquor of ye pancreas is added, from ye situation of ye pancreas in brutes, to that was discovered before the mode of discovery in ye human species, about ye middle of last century. at ye end of ye small Intestine, we find two Intestina cæca, about half a foot in length & there are turned upwards, yt ye food accordeing in them contrary to ye gravity, we shewed ye Int: cæcum to be an organ of more importance, than is commonly imagined in ye beginning of ye great intestines of animals, ye food undergoes some preceptible not yet sufficiently understood. Visible points out ye power of ye living principle

over

over ye organs & yt these do not act mainly from irritation being supplied, yt they do not act from necessity (because an irritat: is supp: in uncertain manner, for were this ye case, ye food would never enter ye Intest: canal, nor ye mouth being irritated they would, but at one time, ye food is diverted upwards, upon ye motion is renewed, when it is fit to be discharged, ye assisting Chylopoetic viscera are ye same as in ye other Class, we have already given & gently at present Madam, that ye organs &c: want ye gall bladder, none is merely accidentally in ye manner in wch ye gall bladder receives its liquor, ye cystic & hepatic ducts opening separately into ye duodenum, while ye gall bladder is supplied by the hepatic (ductus communis) ye Chyle is performed by lacteal vessels, in ye same manner as in ye former Class, only tracing these we do not find conglobate glands in ye Mesentery, & Mr Hewson has also yt ye lacteals of this Class never grow white, but yt ye Chyle is colourless. The

alim: ye

alim. Canal of Bride is tied down very closely by membranes, on account of the great rapidity with which the animal is carried thro' the air, to keep the bowels from being shaken. To keep following the Style & blood, we find the vena cava ascendens alternately dilated & contracted alternately as we do, & may be filled in the same time nearly, by stopping the respiration. But the passages into the lungs are different; we find the true glottis, not in the common place, but at a distance from it, with in the throat, so that we can imitate the voice of the animal after cutting the trachea the bottom of the Trachea resembles the reed of a Hautboy, & with distinct muscles we make the true glottis. Tracing the branches into the lungs, we observe the arrangement of the branches, go thro' them & from the air into cells as it were passing between the lungs & the pleura, & from hence it is extended further, than has been commonly imagined. Mr. Jotin Hunter has lately observed that the air passes into the Cavities of the bones &

a

a Bird. Hence y. lungs are suspended by Membranes, & filled in their place, yt. they might not collapse. The principal use of y. air thus passing into cells, is to render y. body of y. animal specifically lighter; & in entering into y. bones, serves y. same purpose yt. its entering into y. composition of a feather wch. contains air within it; whether same further purposes may be answered by this mechanism, we are as yet uncertain. The animal perhaps may be thereby enabled to bird longer, without respiring, yt. y. same time a bird is killed by hanging, as soon as y. class Mammalia. The aorta here dividen in a parallel way, we find two equal branches produced instead of a Trunk & those again equally subdivided in to two more, yt. an equal qty. of blood may be sent to either wing, as any preference here wd. have been hurtful. From y. circulating system, we find y. same general operations, as in y. former class only y. ureters descending from y. kidneys, open into y. common cloaca

or

or they (in exchange) of urine) along with of Faeces
wch in birds in general, there is wanting
of vesica urinaria, of urine has every
singular appearance, it is of chalky like
substance, upon of dung assault, & such
being received into of vesica urinaria, might
have grown into a calculi, we might here
enquire why Fowls have of urine so particl
while they seem to drink freely; how I
cannot explain it, without supposing it
this appearance is in a great measure
owing to of feathers, that there is a total
separation & waste of an earthy substance,
& a large absorption from of Faeces
there, & in a cavd, where of bones of
of human body grew soft, for a number
of weeks, of urine had a stationary mod
ment, so I have tho. yt if perhaps of
feathers were pulled off a fowl, wch
perhaps kind, till they came to be re-
paired, yt of appearance of of urine did
be altered.

As regard to of nervous System, very
little is to be observed. In exercising
two

taste in ye mouth, we scarcely see Lingua papillæ, & from ye want of mastication we may conclude ye birds possess taste less accurately in gen! than ye former class In ye nose, we find a very beautiful structure, ye olfactory spongiosa are very much convoluted, & it well known ye Birds smell their prey at a very great distance In ye ear there are remarkable differences, ye cavity of ye Tympanum is very diffy shaped & convex, ye membrane of ye drum instead of being concave is convex, & is supported on an Elastic substance, & at ye bottom of ye ear, there are semicircular canals, but it is alledged yt ye Cochlea is wanting, But we find ye same gen! Cucumel! a membrane of ye drum small bones, semicircular canals & nerves spreading out upon them, & ye two ears communicate under ye Brain so yt while a bird listens w! one ear, he is turning both to ye sounding object In ye eye, we observe much more avidity here than in ye former class, ye young

ff

of ye tears, there is an large (and) wide
throughout, they have over ye eye a very beautiful
ful curtain directed by muscles, wch can
cover ye whole of it, & this is necessary
when they flye in ye air, without protection
from ye Sun. The eye upon ye whole is of a
tear, & ye Crystalline lens seems likewise
somewhat more dense for collecting ye rays
more. There we find ye membrana retia
lens, wch shuts ye eye entirely conceal'ing
ye whole ball. Behind ye Crystalline lens
we find a Conical shaped substance of a
black colour, called ye black pursue, & seems
have suspected yt it conveys an alvous
ye dark parts of ye humours, while eye
again suspected yt it serves to turn back
objects from falling upon ye entrance
of ye optic nerve, by altering ye situa
of ye nerve, but that ye axis of ye lens
were changed, ye focus would still fall
in ye same place, so I take ye use of it
to be yt when ye animal is to examine
objects yt are near to him (Book), ye
rays of light fall so obliquely upon ye

lens

low, yt they are reflected from it, but by means of this substance, he turns yt low more to yt object, & yt rays fall more perpendicularly upon yt eye. The Brain itself is smaller in proportion than in yt former class, & we find a great difference in yt appearance of many parts, wch have been misplaced principal, we scarcely discover a Corpus callosum yt septum is wanting, & yt ventricles are diffly displaced, & yet yt gent powers of yt animal are nearly yt same, but perhaps in an inferior degree, thot in many instances, Birds show a great deal of cunning & sagacity, we do know very little of yt functions of particl parts of yt brain, In yt Bird yt decussation of yt optic nerves is very manifest —

It remains to examine yt manner of Generation, yt circumstance on wch more especially this class differs from yt former, & I shall begin wt yt male. The testes are situated higher than yt kidney, wch shows yt yt change supposed by Boerhaave to be made by yt

yt. urine is not voided forth, before yt. uterus could take their rise, that any deference from yt. said dyscrasy, it is greatly enlarged, but without vesicular schirrus, yt. dilatation of yt. extremity running yt. pursue, yt. vasa deferentia end by passing in yt. common cloaca, & yt. prostate gland is wanting, wch. shows yt. it is but of secondary use. Next wt. regard to yt. female you have seen yt. ovarium or bed of yolks on yt. back bone, & it communicates wt. yt. uterus by yt. fallopian tube, yt. beginning of wch. is turned towards yt. ovarium, but it opens wide into yt. cavity of yt. abdomen the uterus is of yt. shape same shape & size wt. yt. of a yt. small end is upwards, & on squeezing it. uterus, an goes out from yt. big end, wch. is shut by a muscular substance, & yt. passage or yt. vagina, is not exactly in yt. middle but towards one side. Next let us examine yt. structure of an egg wch. is more curious than perhaps you suppose it. Between yt. shell

shell

skins wch lined ye shell, at ye great end, there is a bag wt air, wch is a little to one side, & ye whole shell is lined wt ye same, membrane, but ye shell hath wt in it a great deal of glairy substance, what is commonly called ye white of ye Egg, & in ye middle of yt we find ye yolk, ye yolk have a white spot upon it, wch is always uppermost, now if in ye oviduct wch lodges ye Chick, called amnios the yolk have halazæ, or lists of glaire coagulated by heat. If we boil ye egg & cut ye yolk, we find a hole in ye middle, wch was supposed to be ye place of ye Chick, but yt is inviolate. A Chick about ye full time of hatching, is rolled up, so as to take ye least room possible & have ye yolk between its legs, & there is a duct from ye yolk, wch leads into ye cavity of ye Intestinum ileum, into wch ye whole of it passes. . . These are ye several facts, let us next see ye explanation of them, ye yolk is form in ye ovarium, & wn it is connected ye amnios & they are conducted to ye uterus by ye uterine tube, wch by its muscular power

Hence

thrown itself around one of y. yolks. The only doubtful point is, whether y. tube, after having thrown itself around y. yolk, causes a particular yolk to swell, & grow large, or rather y. after yolks have come to be of a certain size, y. tube lays hold of it. The necessity of its doing so, appears from y. structure of y. membrane, y. contains y. yolk, viz. in like a sac cup, hence y. yolk would fall into y. cavity of y. abdomen & putrifying would kill y. Animal. In y. descent thro' y. uterine tube, y. white is added viz. is merely a secretion from y. tube, & added to it, just as any soft ball, rolled among meal becomes larger, then they stick together into y. cavity of y. Uterus, where y. finer parts are absorbed from y. surface, viz. conveyed becomes membranous, & at y. same time y. shell is secreted from y. internal coat of y. uterus. Still y. air bladder is wanting, y. animal lays an instinct of nature opens y. uterus or vagina, & admits a certain proportion of y. atmospheric air whereby y. air bag is formed nearly opposite to y. Vagina — thus, in what sense

y.

y. impregnation is made, or how y. male influence is conveyed, we do not know exactly, especially if Harveys experim.t be just, y.t one copulation is suffic.t to impregnate y. eggs for 20 days or a month. This might lead to y. suspicion of a connubial being related to y. general mass of blood but if y. uterine tube be obstructed, y.t is no impregnation, nor either passes up thro' y. uterine tube, to be succeeded by applied to y. egg bed, or it turns within y. uterus, & affects y. eggs, as they recede into it, & y.t thro' y. intervention of y. glare of y. eggs after y. conception is made, y. ovaria dilate & spread out on all sides, then curious changes take place, both upon y. membranes, & upon y. humours, y. membranes of y. shell put on y. appearance of y. Chorion, branches of vessels are dispersed over all, & spread thro' y. white, w.ch is gradually consumed, & y. young w.ch was at first a bag, containing an oily kind of matter, gradually forms y. air bag is added to keep y. Chick from being long about y. shell, so y.t it comes at last to fill a great part of y. shell

It

It has been thot. yt. ye air was supplied aftenwards from ye atmosphere, or yt. ye same air dilated it self, but I find yt. it is not merely ye air & that you rub ye bread end wt. a greasy substr. you will not prevent ye enlargement, neither can you by a condensing Instrument draw ye air from it, without bursting ye egg, for ye air is received from ye vessels, dispersed upon ye membranes, as in ye feathers of birds, or from Vegetables under water, after ye fluids is come to its full size, by an instinct of nature, it disengages itself, it first breaths a little into ye air bag, wch. we can hear ye sound before ye shell quite way, & soon finding a want of fresh air, it next breaks ye shell round in ye most regular manner, ye matter gently lending her assistance, after ye hatching ye yolk is taken in by ye small Intestl. Organs of ye animal, not having suffict. strength for ye food, wch. it takes naturally —

Lect. 120

I shall explain ye manner of making observations wth. ye Microscope. Without

question

question ye most simple in ye first, where we
receive ye object on a bit of glass, or any transpa
rent substance, or we slide in a tube, wch con
sines a liquor, we then hold ye Microscope towards
a clear light, yt are few objects wch require
ye direct light of ye Sun, ye clear sky in
better, or ye light of a candle, unusually
ably well, 2 are enabled to take a neat view
of an object, 3 examine ye surface of a o
paque object, we may usefully a common mag.
nifying glass, throwing a greater light upon
ye object, by means of a concave mirror.
From this kind of Microscope, we are indebted
to ye ingenuity of ye late Dr Lieberkuhn, who
is also ye inventor of another kind, wch
shows objects to a number of people at once,
requires a very entertaining, that a perspec
tive view, than ye former. We exclude ye
light from ye Chamber, & suppose ye machine
in ye window shead, ye light passes directly
thro ye tube, & falling in ye object, ye pic
ture is thrown behind ye Microscope, upon
a sheet of paper, wch we may still farther
illuminate, or we may have
plaster

plaster of Paris, cast upon marble or ammon)
The Globules of y^e. blood appear in y^e. way like
muskel balls, & we see them moving w^t. rapi-
dity, & where we cannot discover y^e. assistance
to y^e. Sun, we have examined, w^ch. shows y^e.
light of y^e. Sun upon y^e. tube, y^e. Sun alone
having light enough for making experiments
in this manner. The 4^th. class of animals
is y^e. Amphibia, & I exclude y^e. mantes pini-
nati from it, reserving them to their own
place w^t. fish. So two orders only remain,
y^e. reptiles predati & serpentes. The first
order comprehends 2 genera, viz^t. y^e. Tortoise
y^e. frog & y^e. Lizard, for y^e. Draco of Linnæus
is only a lizard w^t. wings. All regard
to y^e. 2^d. order of serpentes, we may speak
of it, as not admitting of farther subdivi-
sion, one genl. structure taking place
thro' all ... Now y^e. chief circumst^ce. w^ch.
we may attend to are the red, y^e. organs of
digestion agree w^t. y^e. former class, being
longer or shorter according to y^e. food
of y^e. animal. But pursuing y^e. Chyle
into y^e. blood, we find it dispersed in

a

a very different way, & in proportion to ye difference, ye respiration of ye animal varied. Let us begin wt ye Auricles, wt some of ye larger Lizards & serpents, we find an appearance of two hearts, & we find as in ye Seal, large receptacles of blood in ye vena cava, both above & beneath ye heart, & examining ye heart more accurately, we find two distinct auricles, so ye Ancients is mistaken in supposing ye they have only one. The ventricles appear to have ye same shape but ye aorta as well as ye pulmonary artery comes out from ye right ventricle, so ye must be a passage thro' ye septum medium, & ye same thing seems to take place in ye larger lizards, & in many of ye serpents, ye blood then circulates in this manner, one part goes to ye lungs & ano^r to ye rest of ye body, (owing to ye force of both ventricles concurring at ye same time, so a portion of ye mass only passes thro' ye lungs, & ye surface of these is so extended, & ye blood returned to ye left auricle, from ye left ventricle

ventricle, from y^e ~~right to y^e left~~ left to y^e right
& from y^e into both anteriors, w^ch receive y^e
blood at y^e same time. As this animal is
not indued y^e same necessity of breathing at
constantly w^ch y^e former class, apparent by y^e blood
only going by y^e lungs, & receptacles being con-
tinued for containing y^e blood before it reaches
y^e cavity of y^e heart. In y^e 2^d Genera, y^e
structure is still less complex, as in y^e
small Lizards, or common Salamander
aquatica, & in y^e frog, where we have
but a single auricle & ventricle, & one artery
from y^e ventricle, w^ch supplies y^e air vessels
& y^e rest of y^e body, & usually about 1/3 part
that y^e lungs, they can live longer y^n y^e
former class, without breathing, so a servant
can be hanged or drowned in half an hour
but it requires 3 or 4 hours to drown a
frog, & y^t is no reason to suppose it
takes y^t y^e blood moves w^t such rapidity
in y^e air vessels of y^e frog, for it is pushed
on by one force thro' it, & thro' y^e rest
of y^e body; y^e lungs of y^e frog do not
collapse, may if you press out y^e air y^m

his

his uesicle, he can again dilate it, wch he does by means of a particle substance of ye Mesentil, wch he can shut at pleasure, & pressing wth ye muscles of ye jawes, he squeezes ye aire much of into ye lungs. Attending unto ye organs of ye senses, we find yt these are exercised by ye same gen: means only ye origin of ye nerues in gradually more extended, as we are told yt a Tortoise can live & move ito body 6 mo after ye head is cut off. wth regard to ye Generation here, they are all oviparous, producing eggs like birds, only some of them hatch ye eggs wthin ye body, while others (do not) them. In ye Male ye testes are placed high wthin ye body, & open into ye common Vasa, & in ye female at ye end of ye Intestinal Canal immediately contiguous ye uterine tube, wch is one on each side, ye beginning of ye tube is at ye mesentery, wch incloses ye Diaphragm, yt is at ye beginning of ye Duodenum, wch in Frogs is placed on ye back, so ye tube cannot be affected

to

to ye ovarium, to occasion ye ripening of ye ova but they ripen to a certain degree without such an operation, & ye manner of reaching ye end of ye tube is incredible, but it has been noticed 100 years ago by Swammerdam, ye ova burst from ye ovarium into ye peritoneal cavity of ye abdomen, & steal leave among ye intestines, till by some power, wch we cannot explain, they are thrust into ye beginning of ye tube, & in ye youngest female, before ye is any room to suspect any application of ye male influence, we observe black coloured substances in ye ovarium resembling ye two poles, wch is ye young of ye frog.

We might consider ye Fish, wch apply ye same water naturally to their lungs, & wch move by ye assistance of fins in it. By this description we exclude ye whale kind, wch from ye structure of ye heart & lungs are properly included ye cl. of Mammalia, ye shape of ye fish is excellently calculated for dividing ye water, & if we were to alter ye shape, we might improve it in ye shape of shipping. ye skin of ye animal is protected

protected by a qty of slime, wch is conveyed by a black line or duct, & yt in a System of lymphatic vessels, wch appear pointed, but really have not valves. The fish is moved forwards chiefly by his tail, but he has a number of other fins on ye back & Belly, to keep him straight in his course, then are diverse at ye lower part ye feet of Linnæus, & wt out doubt they in some measure serve yt purpose, while ye others are rather intended for turning his body. If a fish turns to ye left side, he lets down ye right pectoral fin & keeps up ye left, whence ye body turns round by ye resistance of ye water.

He next examined ye inward texture. Most fishes in order to render their body specifically light, & allow them to descend & ascend, have a bag filled wth air, many ye black line, & in, many there are communicr between ye bag & ye stomach as in ye herring where ye stom: is conical, tends in a small tube, wch goes into ye vesica aerea, yet ye air cannot come from ye alimy canal, but is rather discharged from ye bag into it, & shown you a red vub-

stance

stance), wch I suspect to be a gland yt separates
ye air, for we constantly find such a substance
while in many yt is no outlet to be seen from
ye bag — Examining yt inward structure
instead of a pancreas, we observed a Ne of Intes-
tinula cæca, but there is no room for any par-
ticr remarks. In ye Circulating System we
have we a very remarkable difference; there is
one auricle & one ventricle, from wch a single art.
comes out, & this is entirely lost upon ye gills
of yt animal, I shew you ye whole in a gen.
instance; ye vein wch corresponds wth yt
artery, meeting toge. form one vessel, wch
does not return to ye heart, but forms ye
aorta, or canal from wch all ye rest of ye body
is supplied, & wch runs down ye thorax, & wch
is accompanied wth ye vena cava, wch returns
ye blood to ye heart. Now as ye Aqut: animals
of Linnæus, have ye whole blood dispersed
on ye lungs like ye other viscera, they cannot
have ye Pulmo arteriarum, but must breathe
in a singular & alternate manner, & some
of them can breathe air instead of water
as ye Carp —

Next we observe yt ye
whole

whole mass of blood, has y^e water usually supplied to it
& so both continue in water deprived of it's air, as
formerly inferred y^e hardness of carrying some
thing hurtful, w^ch might be done equally well
by y^e water, we receive a somewhat useful from
y^e air. In y^e heart & lungs, y^e globules are
intimately mixed w^th y^e sp^s but in y^e rest of
y^e body, y^e red Globules are reduced, as we have
a clear view of ascending series of art^s, & we
w^d conclude w^th Boerh: ag^t Haller y^t y^e art^s
divide into descending series. Vast y^e
vena cava is large in proportion, as in y^e low-
most class, so y^e colourless veins return into
y^e heart by y^e lava, as there is little reason to
suppose y^t these form y^e valvular Cysticæ
w^ch respect to y^e veins, y^t is nearly y^e same
organiz^n as in y^e former class, I shew small
very accurately. The eyes of [illegible], only palpebræ
are wanting, & y^e Crystallin lens is more nearly
spherical, & of a harder consistence, for y^e
rays necessarily receive a less turn in passing
from water into y^e eye, than from air, so
they need a denser substance to give them
y^e necessary turn, & from y^e spherical figure
of

y.e eq. is filled for letting in danger fluid, w.ch may compensate for y.e wanting y.e neck. We find every y.e appearance about y.e ear, as only y.t is behind y.e brain, in w.ch there is a clammy substance, much used by Ladies in making y.e short curls, being no hair or flesh, it swims in liquor w.thout any communion w.th y.e neighb.g parts, & it receives Vapours in proportion to y.e age of y.e animal. Now y.t is y.e only substance w.ch in sight we can compare to y.e ear, y.t is no passage into it, & we have only y.e analogy of situation, for we don't find nerves for receiving y.e impression, y.e brain itself is in proportion to y.e size of y.e animal a great deal smaller than in y.e foetus &c. yet they seal so accurately, & perceive y.e muscles more violently y.n we do, & y.e concussion we in y.e opinion, y.t y.e Brain perceives powers beyond those of sense & motion. In all fishes y.t is a gr.t deal of water between y.e brain & membrane, y.t lines y.e shell, whether y.e tremor of y.e air is conveyed by means of this to y.e bone, I mentioned as uncertain. — Here we

end.s

and by observe y. circulation of y. pulse worms.
In y. Generation of Worms, y. only difference is
y. many of them, have a vast number of minute
eggs into water, whilst others have y. same
mode resembling those of Birds, so in y. whole
kind we find a kind of pith in y. heart of y.
animal, & an uterine duct leading down w.
adds y. Glans, while in y. uterine a horny valvular
like y. shell of a Bird is added. So we suppose a
division of such into two orders, we may refer y.
Nant: Jun: to y. 2d: order, from y. difference in
y. generating &c. In y. remaining class of animals
kind very little to observe, I need not detain
you w. y. endless divisions & subdivisions, wt.
respect to y. vessels & worms, drawn fm. y.
external jenny, it is enough for our purpose y.
you understand y. gen. structure in those parts
of y. animal, wch are essential to life, viz. y.
propagation of it, circulating y. solution and
as an example of an vessel, we find y. circula
tion carried on by y. force of y. heart, & we
observe y. same thing of vess. of y. worms, as y.
common black snail or shell fish, & in
some of them branches only supply y. lungs

&c

so in yt Solution & Prob we find yt Divine substance, & yt yt
motion of it depends upon yt small Fool; wt they have, kept
in many we find a Brain, wt in denied by Sir: & Nature
il dragon rule in nature, yt whenever you cannot
eyes & substance title to yt head, you cannot have they
optic nerve a Brain, ora substance, wt when hurt
produces Convulsions, & wilt pain to yt animal
Still lower we find yt heart itself imperfect in worms
worms as yt sea egg, I could never discern any
organ pulsing on yt blood. Descending still lower
as to yt Polypus, yt animal can be divided into a 1000
of parts, so yt probably, yt in no part heart or renal
veins to push on yt mass. Not in Insect to yt Nat.
in some we find a Brain, situate as in us, but in
most worms as yt spiral Gish, yt are small knots, &
thread going from them to yt muscles & tearing
these they produce convulsions, so they are upon
seeing yt office of Brain, or yt whole organ of
yt nerves in not collected into one place, like as
lengths as in worms, yt in a particle spirit, from
wt yt Nerves influenced can be supposed to come,
so when you break a worm off upon a table, every part
of it moves. May perhaps if we were allowed to
reason upon it, we cannot see why yt brain

in

wound in Man; but yt yt organ so tender; & yt Animal
is not covered wt any firm substb vo yt it needs ye
defence, but here when yt Animal is covered wt a
shell yt pluton: & yt antient can exclude yt man
as ever haspe produced them. Nxt wt reg: to Monsters
some believe yt a Monster is produced by ye imp: of ye
male being squeezed neer yt part wt in yt mother
whilst ye fœtus conceive yt no monsters can be produced
in yt manner, but both circumst: take place, for
Animals originally perfect, may adhere & mat: com
wt in ye body of ye Mother, but in such cases ye
changes are slight; & when yt is but 1 head to 2 bodies
or one heart to one Stomach; & yt can be divided equally
to both; or when yt are 2 hearts forming one navel &c
certainly no vitiat: of parts, & produce such ap:
pearances, but these parts must have been ori
ginally formed, & we call such, Monstrous, just as
we call ye Mule a Monster, where ye first
production of ye Animal, & appearance in many
ye same, as we find it afterwards.

I have thus given you such an acco: of ye com
parative Anat: as tended to throw further light
upon ye human Structure, to have gone further
wd have been endless.

Dec: 1721

I have refrained attempting to explain some material circumstances of the Animal Economy which require assistance from Compound Anatomy or from other Sciences, these however are so few in number, that I am not at a loss to give them an appearance of connexion, but I shall endeavour to do so, & to hint in a general way a method in which our Physiology might be perhaps studied with advantage, & in which we might proceed like Mathematicians from the more simple to the more complex facts. The most approved System of Boerhaave & Haller are liable to objections. Boerhaave traces merely the course of the Chyle, by which he is led to describe the texture of our Fluids in a regular manner, but he is far from doing so with respect to the solids of the body he was far from being sufficiently aware of the powers of the living principle, & attempts to reduce every thing to mechanical principles often concealing difficulties, which at seems to explain them. The System of Haller is still more faulty in point of method

[illegible] the Author is abundantly capable of this. He foresaw merely y. matter which lay under one view & may [illegible] more proper to an Organ, just as a writer in y. Materia medica, might lead off layman (down Hippocrates) founded on y. virtues of y. several substances, & [illegible] a good explanation of them; as they occur in y. Alphabetical order which is to be met with in Haller; & you will find he was sensible of y. need and acquainted w. th. occasion, occasion & many of y. most complex operations, even before y. heart, y. nerves or articulate, & y. Brain have been explained.

Now after distinguishing y. Animal from y. vegetable Kingdom, if y. human & general economy be our main object, we ought to begin w. th. understanding y. texture first, & in y. strictly Anatomical part of y. subject, we examine y. fluids & solids of y. body. Here after that we ought to endeavour to discover y. different actions of which y. machine is capable, & hence we discover merely y. power of y. heart without at present considering y. cause of y. alternate motion, & so of y.

y. other Organs. When y. actions are understood we proceed a step further, to determine y. manner of effects, which y. actions may be supposed to have, & lastly we observe y. connexion between y. living principle, y. mind & y. body of y. Animal, & investigate y. various ways in which in consequence of it, y. body may be influenced when we would observe those powers, on which y. being of Animals in general depends, we would perceive their vital powers. But not for y. continuance of these powers, a supply is necessary to repair y. waste, & lastly we would examine y. propagation of Animals y. powers by which they are enabled to continue their species. Shewing this method in view, I shall proceed to y. operations that remain to be explained.

I had formerly observed that y. Animal Kingdom, was readily distinguished from y. Vegetable by y. will, y. volition which y. Animal exercises, and can never add a more evident & anatomical character that all Animals receive y. supply within y. body, where it undergoes an organ-

similar

similar to our stomach certain changes before it is fitted to be received. The changes that in y. Cytho-phyta & Zoophyta of Linnaeus, which ought to be included under one order of Cytophyta; for as to the vastly prevailing plants, & those flowering & producing Animals, there is no pretence for it. We find y. regular figures to be either constructed by y. Animal, after it has acquired a certain degree of perfection, or it may be found y. Animal enamel'd in regular matter, so that the same kinds of Animals produce figures of different appearances. The Kingdoms being separated, & our view directed to y. human Oeconomy, we must next enter upon y. anatomy of it, & as we have already examined fully y. structure of every System, & determined y. principles of y. circulating mass. We are also acquainted w.th all y. powers of motion which y. Animal exercises, & shewn likewise our indeed y. effects of that motion, & lastly remains on this subject to mention y. ideas which Authors present us with w.th respect to y. power of y. heart.

&c.

The power of the heart is evidently very great. as
if a pint of water in pressing on between 16 & 20 pounds
of blood, as we learn by trying the pressure of the
male, or from finding as in the experiments of
Dr. Hales, that you can draw off from a vein
in a large animal a pint of an Animal the pressure &
its weight, as a Man weighing 200 pounds
would only die after he had lost twenty
pounds of blood, & after death the muscles may
nearly retain their colour, may when this
stopped a tube in the carotid artery of the Animal
the blood rose to a considerable height, so we
must suppose that more remained than was
drawn off. Then the motion of the blood is
with considerable velocity, even in the veins of
the Animal. Next the heart being supposed
to be the only mean, it lifts as it were
the weight of the pints of the two, pressure of the
into the body, & even overcomes the pressure
of the atmosphere. So our vessels proceed &
find them divided into numerous branches
& these are not placed in the right line to
but a great part of the force of the heart is
lost by the different turns of the arteries
Then

then at last they (divide) into (Branches, which end
only near y.e nature age, but are difficultly seen
w.t y.e Microscope; that containing red particles
& if we may credit Calculations made of y.e quan
ty of y.e Fluid of y.e red Globules (does not exceed y.e
300.e part of an inch, & y.e surface equivalent
y.e blood moves, is continually increasing &
entering into Calculation we are not to
w.t y.e number of vessels, & w.t y.e surface
over which y.e blood moves in every vibration
of y.e heart, you have seen that the ventricle
of y.e heart, is able to contain at least two
Ounces of blood, we supposed two ounces thrown
out at every vibration, it passes from y.e heart
into a vessel very nearly an Inch in Diameter, y.e aorta, we must suppose that
a two inches section of it to be equal to
a square inch, Now 60 such vibrations &
more are given in y.e minute, or 1200 Ounces
or 75 lbs pass thro' y.e heart in a minute
& measuring y.e blood two Cubic Inches are
nearly equal to an inch Ounce, & two
Ounces at every vibration of y.e heart, four in
ches in length of y.e aorta may be conv
[illegible]

globely filled. Now we can calculate ye real velocity of ye blood in ye aorta w^ch once, the heart emits in a single minute, supposing ye diameter thereof 60, or 240 inches in length, but ye whole of that motion is communicated in ye very instant that ye heart is in action which is only ye third of that time, ye velocity is 3 times greater than it is commonly calculated following such principles. Now we have the number of capillary vessels is very much out of sight, we'll not give a guess at making such a calculation. The diameter of a capillary ruling upon ye topmost ground plot, is equal to ye three thousand part that is we can dispose on ye side of the column of blood a thousand different arteries, & there would be ye same number on ye other side), so ye number of such arteries, or vessels fill ye square inch would be 3000 × 3000 9000,000 ye sum total branches of our arteries put altogether would ye same weigh in ye aorta, there would be of capillary vessels in our body Nine Million. But not

next yt. area of yt. arteries is continually increasing
that yt. branches of any artery together make a
much larger bulk than yt. trunk, so manifest
how much yt. area of yt. ultimate branch-
ches exceeds yt. area of yt. trunk to complete
yt. calculation. N.B. This by observing yt. rapi-
dity of yt. circulation in a transparent part
in one of these ultimate branches, & viewing
this wt a Microscope, States alledges that a
red particle in a capillary artery of yt. mesen-
tery about yt. 100 part of an inch, to occupy
it three fourth inches, 100 thereof will be
necessary, so multiplying yt. number we
have got by 100, we determine yt. number
of capillary arteries to be 3,600,000,000
& do not doubt that their number exceeds
this, because there are many of a deter-
ring order. Now yt. very mention of
that number, & which carries along with
it an idea of yt. surface to which yt. blood
is applied, gives yt. most striking proof
of yt. very great power of yt. heart, & of
other organs promoting yt. circulation,
& prospects us for further progress of calculation:

much

which have been mutilated in y. subject, & for want
of methods proper for ascertaining & determining y.
true sense & meaning, but y. more of them have appeared
y. truth, appears from this that they diverge very
much, some reducing y. force & expansion of
sounds, while according to others it appears to be
many thousand pounds, but y. whole is not
generally received, & most respectable persons
have been made to y. of S.t Matthew, for methods
by many have been thought convenient, but yet
might it may more appear to be, if some
effort in y. candid study of our Universal
source of knowledge & wisdom in y. Holy
Bible, that these points & operations
& revelation here generally agreed to have only
to determine if might effectually upon y.
surface of y. head for y. head for y.
y. head in y. same form, not a hair of the
head to fall even upon y. head, & this proves
upon to me made to fall from the head
only from y. head to y. head, & this
becoming upon y. head in y. same manner
in which, & for to be a small number
in order to explain y. subject more earnestly

Suppose that an Artery of the Circumference of the Animal's Heart, & from it to contain 14 square Inches. Now my next business is to find out the weight of 100 Inches, & was to find & measure in a Horse Heart then how many 100 cubic inches would rest upon the surface. It is evident that there would be 100 Cubic inches. Then calculate the weight of these, & find it equal to 7 Ounces. Mr Hales concludes that the Heart acts with a power equal to the weight of 200 Ounces, & now way of determining the surface of the whole heart & then making the calculation of the whole height in the Artery with a Quill from the Heart of a Horse, if we fill the Tube with water & then fill the Vessel, the pressure on the bottom from the Water is the same, as if no Vessel were there but the Tube only reaching to the Heart, we must admit that merely arises from the weight of the blood upon the heart, his conclusion is just. But we cannot apply that to the action of the heart, for with the pressure which the heart makes, there is a elastic power, the powers of which we certainly cannot calculate, as it must be put in

in a board with a hammer. I do not apply the force of a hammer & press on the nail, but I squeeze it in like manner the action of the heart would overcome a obstacle, the effect of which is vastly greater than that & more powerful, & I take it for granted that the power of it really exceeds what has been calculated.

Neptune would compare the force of the heart, & of our arteries together, but we will find it difficult to do so, further than to show that when the heart is in motion the blood is thrown from an artery of middling size, with greater force than when the heart & the artery is cut, but we are not to conclude from this that the heart is more powerful in transmitting motion than all the arteries taken together for the arteries to their ultimate branches are active, & we cannot say to what degree the activity further on the blood. So in a pipe the whole mass of blood, by the power of the heart is thrown into the pipe, but coming from the pipe, it presses on those after it, which (as the force of arteries, like an Hydraulic machine) by the system of the circulation

vessels

Vessels) of which y^e veins & y^e Lymphatic vessels make
y^e whole of y^e external covering of the Body. The Structure
of y^e heart is best in y^e extremities of y^e Animal
System; we must carefully observe much less activity of
y^e muscles, and less effect y^e muscles in performing
y^e motion of y^e blood in y^e arteries as
well as in y^e veins. ()

Understanding y^e manner of y^e
motion of y^e general mass (& y^e force of y^e
Organs, by which that is performed, we
next proceed to consider all y^e ways which
it may come. But there I have formerly
explained, & every material circumstance
connected w^th it, are excepted, which I enter
upon now, w^th reluctance, from y^e extreme
difficulty of drawing any certain conclusion
how far y^e motion & y^e heat of animals is
connected, or how far y^e heat of animals
may depend upon it. We are in reality so
little acquainted w^th y^e general cause
producing heat, y^t we must find ourselves
very greatly at a loss to determine y^e par-
ticular causes operating in y^e Animal
body. Thus we are very sensible, y^t heat

on

on ye surface of ye Earth is much owing to ye influence of ye Sun; & yet 'tis very doubtful whether there be more heat in ye Body of ye Sun than on ye Earth. In like manner when we discover attempt to discover causes of heat, we are apt to say that ye friction of bodies on one another, fluids as well as solids & all three running together produce heat; & yet I find ye very Authors who entertain those dor prospering experiments so far like in appearance to us, that we would imagine ye consequences of all ought to be ye same; & yet in mixing one liquid there is a violent motion & heat produced but in mixing others, as in dissolving neutral salts in water, ye acids wth ye Alkalies in general we see similar motions, & real similar effects, but are disappointed, & find ye former degree of cold produced. What account then are we to give of ye heat of Animals? Various opinions are proposed, which are plausible at first sight, & yet examining them they are loaded wth difficulties & objections.

1

Putrifaction is procured by some of ye principal Causes. 1st. Find yt Vegetable substances heaped together contract heat, & being afterwards put into a retort & distilled, they afford much more, or as great a quantity of Alcali than they did before Putrifaction. Animals than they do before Putrifaction. Animal bodies readily run into putrifaction after death. May I have no doubt yt Animal substances very much putrified & likewise like a hay stack produce heat, & on calling into ye heart of a Whale, which had been a fortnight under water, I found a heat wch I ascribed to a degree of putrifaction, but in smaller subjects exposed to putrifaction, we do not observe yt because of ye atmosphere & other bodies around carry off ye heat perhaps as fast as it is generated, or nearly so. But we are surely not to apply this for explaining ye heat in our bodies in a healthy state. For if yt were ye case, & ye heat is effected by ye Vegetable substances we are continually throwing in, we should observe it in very different degrees, at different times, according to ye having taken, or wanted food for a length of time, or according

according to yt. kind of food. Whence we are enabled
that when we have taken yt. most antiseptic sub-
stances, in a large quantity, fumes, Spiceries &c.
if heat of our body is increased, or we find that
after an Animal has fasted very long, there
is no great increase of heat. Hence (doth we
find yt we can at pleasure increase yt heat
of our body by running a few yards, &yt. on
blowing ye coals, whereas if this was owing
to a putrefaction of yt humours it would in-
crease, in like manner heat is generated
in particular places, where yt whole
body is not affected, whereas it would be
equal in all, if it was owing to yt putri-
faction of yt circulating humours, &c, that
tendency to putrefaction (however it is equable
in a certain degree, I am far from con-
ceiving that as a principal cause. Nor
some have had recourse to supposed prop-
erties of yt nervous fluid, or energy, to an
Ether, an Electric matter, a philosophical
where we have very little ground to proceed
sufficient to proceed on, & particularly, it
is supposed that in the lungs this heat
is

But yt motion of yt Body have a further effect then
in a general activity of parts, in which every fibre
& every particle of yt fibre plays upon another, & yt
heat is found yt greatest, where, whilst yt
general force of yt circulation is maintained, yt
particular arterious act wt their full vigour, it
is produced violently, & is supported for a conti
nuance of time by yt activity of parts, in a man-
ner I do not pretend to understand, but every
circumstance seems to show this. Then yt
general motion thro yt heart & larger arteries
in one cause, for if this languishes, yt heat
too, wishes, or we diminish yt heat in an
inflamed part, by stopping yt rapidity of
yt blood thro yt arteries, or when an artery
is tied up, that yt nerves exert their powers
fully, yt member becomes cool, that there
is as much motion, as is sufficient to pre-
serve life, whereas if we produce a dila-
ted state of yt vessels, or by a topical sti-
mulus, whether of a septic or antiseptic
nature, we find yt heat is generated. So
upon yt whole, I apprehend we shall find
yt heat depends chiefly upon yt activity
of

of ye respects. Whether ye nerves operate in a primary, or secondary way, we are all at loss to determine but we are not to say that they operate in a primary way, because a palsied limb is cold, for ye cannot happen without ye loss of ye activity on which ye heat depends. From this view we may understand in some measure, how ye heat of ye body remains pretty equally ye same in Summer & Winter, or why it is not increased enormously in a duke warm bath where ye body is not losing much, because ye heat of ye Sun or a Bath, have an effect like to ye of a watchful nurse.

From ye operations described formerly & adding ye influence which heat has upon ye body, we perceive ye necessity of secretion by which we do not mean merely ye separation of ye component parts of ye blood but with this, further changes, which these by ye glandular structure undergo as I endeavoured to prove formerly in opposition to Haller. If this idea were just, ye detaining any of ye secreted liquors in ye mass, or forcing them back

each after they are separated, would have the
same effect. Thus we know that the common
Fluid, altho it appears to be very
dense & fixed, yet
does not act after the strict
laws of the Attraction, but is (depended
upon certain principles in the general mass
we retain these by excitation), so violent of
the Fibers being diminished, it would be
increased; & all other effects of it would
be more manifest, & in like manner the like
when retained by a retaining vessel does
not produce the common effects of Gravity
(dice), as the following, these (depend upon
the like) having been first erected & then
returned to the mass.

Sect. 122

Hitherto we have considered the human body
chiefly as an Elastic system, we must
now proceed to trace the connexion between
the body & the living part, & bring related
the ways, in which the living principle
is rendered sensible of impressions made
or injury done to it, & the means by
which in consequence of such impressions
arise, & perform its actions. By these

recollect yt formerly in yt course, I endeavoured
to explain both ye many Fully, yt little more
remains, than a supplement to one of yt
organs of our senses, yt Eye, I formerly took
for granted yt a picture of yt object was both
all ye formed on yt bottom of yt eye, we
now consider yt manner in which such an
effect can be produced, for unless ye
circumstance wt regard to yt eye be under
stood, cases will occurr when you can
neither judge of yt cause nor of yt cure in
a proper manner, you know yt any luminous
body, as a Candle, scatters its light on all
sides, particles of light are thrown out
from it, which run in straight lines
for if any object be interposed, as a cover-
ed tube, we can't see that it, as it
proceeds thus, it is gradually growing
fainter, because yt scatters & yt in
yt proportion of ye distance. & yt (dis-
tance), that light falls on a body
which it does not penetrate, as a
plate of silver, or a mirrow, it re-
bounds from it, or is reflected in yt
same

same direction in which it falls, just so when
one shutton a little ingd. ground, it moves al
yd. same angles in yd. opposite side. But if
yd. substance allows yt. light to pass thro it.
& if it falls streight upon yd. substance, it
passes into ye direct course, but if it slants, it
is found by experience, yt. it makes an
angle, where it enters inwards, towards
yd. perpendicular, if it passes into a denser
substance, & yt. turns in, wt. a force proportioned to yd. density of yd. substance
Now you all know this, wt. out having
made much reflexion about it, for if
a streight cane is dipped into water, it
appears crooked, or if you put a shilling
wt. a bit of wax to yd. bottom of a vessel
then walk backwards, till it. edge of
yd. vessel intercepts your view, or pouring
in water, it immediately seems to rise
near yd. surface, or if you look to a
fish in water, he is always deeper
than he seems to be, so if a person
is to try to shoot a fish under water
he must point lower than it.

Now

. how in a ray passing from air into water is
turned towards y. perpendicular, so when it
passes from water into air, it is turned away
from y. perpendicular. Now as y. circum-
stance (defence y. power of y. eye, in collec-
ting y. rays of light, & we can readily trace
them, how y. crystalline lens. The middle
line falls perpendicular, but y. rest fall in
in a slanting direction, & y. only difficulty
here is to find y. perpendicular. To do
this we (draw a line from y. centre of
y. sphere, & wherever y. strikes, it must
be exactly in y. middle; & in this way
we find y. focus of all y. rays, & we may
form y. figure of any object, w.t all
y. humours of y. eye, collected upon y. retina
at y. bottom of it, & we observe y. figure
inverted, owing to y. refraction
coat behind . . . , how let us now
trace in y. eye itself y. rays of light, &
observe y. use of every part, as we have
them coming from a part, or any thing
w.t two ends (different). And ray falling
perpendicular, passes directly thro' y.
eye

eye, & comes to y. back part, y. other rays in
verge turns, as ray falls very obliquely, it is
perhaps cast off altogether, but supposing y.
it penetrates at y. very entrance into y. eye
y. principal turn is made by aqueous hu-
mour, yet we speak & justly of y. crys-
talline lens, as being y. principal cause
y. makes y. turn, because if it had occa-
sioned y. anterior part of y. eye y. turn
would have been still greater. Now to
find what turn y. ray from any tracing makes
towards y. perpendicular, Draw only to
get y. centre of y. Cornea, & Circumscribe
respecting a perpendicular. Now as y.
lens is more dense than y. aqueous
humour, plunging to y. bottom of water
& has more of y. oily or sulphureous matter
so will give y. rays a greater turn than
in proportion to its density, there is to
y. turn made, as y. ray enters y. lens
towards y. centre, Next y. ray passes
into y. vitreous humour, & it has been
imagined by Haller, y. y. vitreous
humour rather prevents y. ray from
meeting

melting, being more rare than ye lens, but would observe first, ye more different these are in density, ye greater ye lens must be. The Vitreous humour is (here) rather from necessity, than from ye choice of nature; for merely to give ye rays their proper direction it substituted would have made ye lens greater; but a tough substance was necessary for a cushion to support ye lens. The density however is to be in such a proportion, yt ye lens is considerable, for ye rays turn away from ye perpendicular turning still more inwards, I so consider it in this manner, we assume a circumstance, which tho described is not accounted for; yt ye posterior part of ye lens, makes a greater curve than ye anterior, for in proportion to ye curve, ye lens increases — So all ye rays are brought to one point, or here we have ye head of ye chief accurately represented supposed, & we might trace ye rays from ye point in like manner as ye chief is situated, especially to ye middle of ye Crystalline lens, or ye out

vide

ride of ye optick nerve, & you answer yt ye object is inverted, How comes it then yt we see ye rail in its true place, & how comes it yt ye object is not inverted? The solution is simple most Authors have perplexed themselves to no manner of purpose. The explanation has been given by Des Cartes, by ye comparison of a blind man, searching his way w^th a couple of sticks, if you take a couple of lines representing them, & touch one substance w^th ye one, & another w^th ye other, that yt which is undermost as to ye uppermost hand, you know yt it is underwost from ye direction, In like manner I know by an instinct of nature w^thout reasoning yt no ray can fall from an object on ye bottom, unless ye object is above it, & we judge entirely from ye situation, from ye direction in which ye rays have come to ye eye —

Next you know Images grow less in proportion to ye greater distance ye object is removed from us, but when viewed by magnifying glasses, they remain equally distinct — Why then do

(do we see) (a mean) object, better than a distant one! (Porterfield &c account) for it, from y. substances floating in y. air, intercepting many of y. rays. (But there) no (doubt), yt y. effect would be y. same in vacuo. The reason is yt y. impression is multiplied, if y. (distance be (doubled), y. same picture from y. nearer (distance) is painted on four times y. space & on every part of y. space; y. impression is as strong, as when y. rays of y picture is (diminished), so four times y. surface of nerves is impressed, & multiplying y. impression is y. same as y. increasing y. sensibility of y. nerves. —

We next consider y. way in which y. eye (adapts itself) to objects at different (distances, some have (denied yt we see an object perfectly in any one place), because they cannot see instruments by which any change can be made, altho we suppose y. lens to alter its shape, by means of a muscular power in its layers & figure, altho we suppose yt it is fixed formed by y. Ciliary processes, altho account

for

per il fuoco p. 7 no. allowing p. convexity of p.
Cornea &c. But these speciale may little in vision
& I suspect it will be found p. there is not only
an alteration, but that those who have had p.
Crystalline lens couched, see nearly as well
as others. That is, we accommodate p. eye
chiefly to p. distance by p. action of p. Iris
allowing more or fewer rays to enter p. eye.
That there is a real change of p. eye, is clearly
proved by Scheinerio, that by this variation
of p. manner of p. change, he makes two dots
in a bit of card, & p. partition between them
not more than p. breadth of p. pupil. Now
if you shut p. left eye, & look thro' p. hole
in p. right, you see one candle only in
one situation; but in every other, you see 2
candles. This seems to be one proof
of perfect vision; & in all others p. vision
is imperfect. But now if, while p. head is
so situated, you open p. left eye, you have
a single appearance, as there is a real
change of conjunction, made on p. Iris
& place two pins in a straight line, &
looking at p. nearest, you see p. farther

distinctly, but if parts of the other become
obscure then fixing your eye on ye furthest off
part of ye Island become indistinct, i.e
ye eye has altered its conformation: Euler
thinks alledges yt it can adapt itself accurately
within 7 inches, but Dr Reid yt ye limits of
distinct vision go much further, yt is to
go to ye distance of 10 or 12 feet. But as to
ye means of alteration, everyone of them do can
not have ye supposed effect. — The muscles
act unequally, ye crystalline coat in some ani
mals, is cartilaginous, so we cannot suppose
ye smallest change to be made in ye eye
but all animals suppose ye motion of ye Cry
stalline, which is exercised in a quite explosive
way, than is commonly imagined, it not
only adapts ye eye, to a sufficient degree
of light, but when the view, minute ob
jects near to ye eye, ye motion of ye ret
can be observed, ye effect of this you must
judge of very readily from trying to look
ye apertures in viewing a distant object.
Thus if we bring a small printed Book
near to ye eye, ye letters are intermixed
but

tal if we clap between y^e hole & y^e eye a card
w^th a small hole in it, & look y^e letters distinctly
the nearer y^e superficies of a Microscope, by cutting
off y^e superfluous rays, which fall obliquely
& disturb y^e clearness of y^e picture. So this power
of y^e eye chiefly depends upon y^e motion of
y^e iris. ——— Now after explaining
what is proper to our eye, you understand
y^e reason of short or long sight, viz^t why
people are long sighted, & idiots again are
short sighted, & we can (discover) this by
looking at y^e eye, there is a circular rounding
in y^e cornea, as y^e dotted line shows the
y^e retina, between it & y^e crystalline lens
& they must bring y^e object near to y^e eye, by
which they throw y^e focus farther behind
y^e lens. ——— Now if a person possessing
y^e ordinary degree of sight, was all at
once short sighted, objects would appear
much larger to him, as in viewing an
object w^th a microscope, which only en-
larges our conceptions w^th regard to it.
We know, y^t we can see an object
at a moderate distance of 6, 7, or 8
inches

when naturally, if then I see any object as it
naturally, I conceive, yt it in all yt distance
if yt object can'll be seen at such distance, nor
conceive yt it must be of a certain size, so we
must see it magnified wt yt microscope; &
again my eye is too flat, yt beam falls before
yt retina; so elderly people assist themselves
wt a convex lens, to bring yt rays nearer: &
whereas short sighted people, use a concave
lens, yt yt eye may collect them in yt proper
place. . . . How why have we two eyes
since one can collect yt picture, & distinctly
object wt tolerable accuracy. Accidents
are guarded against, by yt decussation of
yt optic nerves. 2. The impression is mul-
tiplied, we see better wt yt two eyes, than
wt one. Reading Hatter, who has yt mis-
fortune of being short sighted, so brings
objects so near, yt he can use one eye
only, he would persuade us, yt we only
use one at a time, But we use both
& reap yt advantage of seeing much better
& of judging wt more accuracy. Besides
a farther use is alledged by Porterfield, yt

y.t we judge of y. distance, & one, judge of y.
magnitude, supposing y. distance equal, but
by bending y. eyes to y. same point, we
take y. angle which is formed, & from an in
stinct of nature we judge of the distance.
So you may by y. experiment of shutting one
eye, & trying to point out a dish of tea, or
to introduce a crooked stick into a ring, you
will do it (difficultly w.t one, & this is not
from y. want of habit, for y. person w.t
one eye never does it w.t accuracy, that tells
him we do upon y. first trial, if y. eyes
happen not to fit exactly, if y. one have a
conformation different from y. other, we
see but one, or y. person from this circum
stance gets into y. habit of squinting, this
this may depend upon a real dislocation
of y. axis of y. eye from y. crystalline
lens, being placed too much side ways
&c., but generally, there is not y. small.
est ground for alledging this, for on
shutting one eye, y. person can look
directly w.t y. eye he only turns one
side, when both are open, as confounding
y.

yt. impressions. How if yt. is attended to, it leads to an attempt of error, and shuts yt. strong eye, till by habit yt. weak eye, acquires equal power & in this way, we may succeed in curing yt. complaint.

The last question heard is, How it comes yt. we have two eyes, object appears single. Imagine yt. a great deal has been wrote upon this subject to very little purpose. Nature from yt. first moment of seeing, teaches us to judge in yt. way, we and conclusions yt. yt. eyes are directed to yt. same point by an instinct of nature we turn them to yt. same object, so our two eyes never see. Besides we see yt. same appearance, yt. same number of points present in yt. same situation, & it is impossible to conceive two objects absolutely similar, & we have yt. reason from yt. place where yt. object is given. By habit indeed & further circumstance is added, yt. impressions are made on yt. same parts of both eyes so that we are looking at one object if one eye is convulsed, yt. muscles affected, we

we seem to see two objects, yt. impression coming on a place, yt. has not been used to it, just as when we cross yr. fingers on a pea & roll it, we judge there are two, because it comes to both parts, to which natty it was not habituated.

Sect: 12.

The various operations we have considered as going down yt. oesophagus & ultimately attaining & dispensing yt. fluid parts, renders a fresh supply necessary for yt. continuation of their life, & this you know is sought for from yt. vegetable, or from yt. animal kingdom, we by nature seem intended for both this appears whether we consider our teeth to yt. structure of yt. body, yt. general custom of nations, or analogy w.t similar animals you already know, yt. mechanical operations, which yt. food undergoes, & yt. general appearance of yt. liquors, which are mixed w.t it. It only remains yt. I attempt to explain yt. manner in which yt. food we take in is digested, & at yt. same time render it safe, for having received, or assimilated to yt. constitution

you

You will be entertained in a rendering this subject, to find nearly ye same opinions professed two thousand years ago wt regard to ye effects ye are given by ye present writers. Upon ye whole ye following circumstances, are chiefly to concern. 1 That ye division undergoes considerable changes by ye acts of chewing ye Food wch joins to ye Food a certain proportion of Liquids, whilst it passes thro' ye mouth, the video ye mandication & undergoes, there is a considerable mixture of ye saliva, & ye mucus wt it. Within ye stomach it is impregnated wt ye Liquids, & it is there subjected to not only ye action of ye muscular coat of ye stomach, but to ye agitation of ye intestines running upon ye parts, & to ye alternate motions in respiration. At ye same time it is exposed to ye heat of ye body, which joined to moisture & motion, we must suppose to have an effect, to a certain extent But we are by no means to conceive ye circumstances I have mentioned are ye most essential, for wt'ever of them Digestion takes place in any

one

one or other of ye Tunicles of animals, ye chief cause is ye humours of ye stomach; acting as Menstrua Thus Dr Young have shown in his Theoria Dr Tale, that ye humours of ye stomach of animals be fore they have tasted of food, are in ye stomach, perfect ye power of curdling milk. It have also been seen in those Animals ye never taste of milk, as their natural aliment, as ye Birds, as this gives a suspicion of this humour, is materially different from ye newly eaten parts of ye blood, Vessels, Anatomists of ye last century have observed in birds, ye parts of Crayfish when eaten ye latter melting down in ye space of a few hours, that ye past included in ye stomach, were digested, whilst ye past lodged in ye Oesophagus remained entire. I have mentioned ye experiment made on a dog, of giving him hard bones which were dissolved. In ye ruminant Animals again, we find ye inner coats of ye several stomachs, differing from one another, & we find ye food in different stages in these — 6 Vessels we have

seen

ween y^t. y^e. assurance of y^e. stomach in differ^t
kinds of animals, natures according to y^e. nature
of y^e. food, & in fact it is found to possess in y^e
different powers, so Shaumont included grain
& flesh in cylindrow of iron, perforated in holes
& gave them to y^e. carnivorous & granivorous
birds. The flesh in y^e. carnivorous were
melted, & y^e. grain in y^e. granivorous, but
reversing y^e. experim^t. y^e. changes were made
less perceptible, as y^e. liquors of y^e. stomach
evidently acts as powerful Menstrua, & to
this M^r. John Hunter have added very con-
siderable weight, by having discovered y^t.
in y^e. stomach of Malefactors, y^e. coats of
y^e. stomach itself were dissolved. From
this he justly infers that this power of
y^e. liquors remaining after death, but
he has carried y^e. matter too far in
supposing y^t. it never acts, but upon y^e.
dead body, I have discovered y^e. destruction
of y^e. coats of y^e. stomach in a few persons
but I consider this rather as y^e. effect
of y^e. disease, not conceiving that y^e. quan
tity of y^e. Menstruum, would have had so

great

great an effect after death. I have seen there was great reason to suppose, yt. ye stomach had begun during life. A Dog about 12 years of age, had considerable oppression & pain about ye. stomach, & died suddenly. The Body was opened 30 hours after ye death, & ye coats of ye. stomach were found destroyed, so I suspect that this might happen before death, & sundry living animals, as eels, have been found dissolved in ye. stomach after death, while ye. skin remained alive in ye. throat, so this may be a source of disorder, at least ye. Circumstance well merits attention. As ye. other causes mentioned, I think there is no reason to add ye. effect of ye. process, which for want of a name sufficiently expressive, we call Fermentation. In this subject ye. experiments of Dr. Mr. Bridie are the most satisfactory. Sir John Pringle had suspected an acetous fermentation, & Vinegar to be formed but ye. first effect of ye. fermentation is to produce a sweet substance, in opposition to sour & this forms new combinations in ye. food, & assimilates it to ye. animal

&c

& yt. changes on our food are much more conducive than in yt. imperfect imitation of it in yt. rest of yt. Alimentary canal, yt. food continues to undergo similar operations, as appears from yt. different long. of yt. Alimentary canal & ~~yt. food continues to undergo similar appearances~~ in yt. herbivorous & carnivorous, for yt. in yt. ~~progress~~ process of digestion more completed in yt. stomach, yt. different texture would not be so observable, & in yt. herbivorous kind, yt. intestinum cæcum has a very complex structure, & is very large. The food within yt. intestines, receives yt. addition of some liquors, yt. seem to resemble those of yt. stomach, it receives a further supply of saliva from yt. pancreas & a quantity of intestinal liquor from yt. extremities of yt. mesenteric arteries, like yt. in yt. stomach, & further it receives yt. bile, but yt. we of yt. is so little under stood, yt. I would avoid saying any thing about it. The canal by means of it is solicited to contraction, but further in all animals, yt. Duodenum is larger than

than ye continuation of it: it does not return again; & ye food is purified by sleep, & such a remora may by no means necessary for circulating ye canal only.

After ye food has undergone ye process of dissolution, it is taken into ye constitution by Lacteal vessels, & mixed w^th ye mass of blood, & all ye further changes made upon it, have been mentioned as far as can be done w^th tolerable certainty.

Along w^th ye digestion of ye food, we are to consider two other circumst^s, which seem equally w^th it, for ye growth of animals I mean first ye animal, which is from ye experiments mentioned at first, we seem to perceive from ye surrounding element. The other circumstance is ye state of sleep, which is intended for recruiting ye animal, as much as digestion itself. But on this, I shall only make a few observations, sensible of ye difficulty when we attempt to go far. What I mean to alledge, is y^t ye principal cause of sleep, is very generally misunderstood

[illegible] ... Physiologists ... [illegible] ... mechanical circumstances, whereas those merely induce a disposition to the state; if the animal receives a quantity of food, that of the middle nature, it soon grows drowsy & feels inclination, disposes itself to sleep, & the inclination to sleep continues for a convenable length of time, till the nutriment received have been reduced by the assimilative power of the animal ... Next you know the bodily labour disposes to sleep & the attention of mind has the same effect, & the contrary of all these dispositions to wakefulness. But if dispositions to these states exist, & will not produce them, the superinduced causes of sleep, to counteract them, we shall never comprehend, it is only by strict attention to nature (by which we mean mind as well as body, from the due exertion of their powers, and not by any powers, which do not essential to life we can therefore go no further) than to shew the circumstances & the disposition, & it is unnecessary to mention

tion

tion more than yt most common.

When we now review ye operations of ye Animal, & recollect yt ye heart & ye brain act upon each other in a circle, yt we are at a loss to distinguish cause from effect; & now we observe yt ye animal possesses not only ye power of repairing ye real waste & ito substance, but increasing ye solids & ye body from whence this perfection, & allowing them to recover their tone reasoning in this manner, we would conclude an Animal to be made for immortality & we learn ye contrary more from experience than from reasoning. But supposing yt not only from ye general appearance, this conclusion were just, but yt animals were so constituted, yt ye waste & ye repair should be exactly made to ballance each other, still we should perceive ye necessity of animals possessing ye power of generating their nature, or continuing their species. External accidents would render this necessary. But to take things as we find them, yt ye different genera & species of animals are limited to a certain duration, & wc

which yf. powers of yf. Creator is more manifested, than on yf former supposition of all having yr. own. Because yf. world is governed and yf. regular manner, that to a certain period of life, yf. species gradually exceeds it, then from yf. middle period decreases, yf. contrary is observed, but tho' many things as we find them, yf. creation is more diversified, appears more beautiful, & one generation succeeding & yf. race of animals is not maimed wt yf. unavoidable accidents of long life.

In generation some few animals produce their young by shoots, as Vegetables (do which yf. head & brain are wanting. In some others, an individual possesses yf. power of generating its like). But for yf. most part two animals, male & female, are joyned, & yf. even where yf. Animals are Hermaphrodite, & in yf. case of most of yf. worms. In generation parts of yf. bowels, I have so particularly explained all yf. parts, & yf. diversity

durations w^t respect to Generation, yt may still now remains, except yt we consider how far yt rudiment can be supposed to proceed from yt male, or from yt female, & so connected w^t generation, yt we consider ye cause of yt Menstrual flux in women.

The rudiment of a Foetus is so exceedingly minute, yt we must judge as much by reason & conjecture, as from actual view of ye rudiment. Many have supposed that yt rudiment comes entirely from yt male yt ye female furnishes merely a lodgement to it, whilst others suppose yt rudim^t to preexist in yt female, & to be only into life by yt male influence. Now yt first opinion was in a great measure founded on yt appearance of yt male semen yet before yt microscope. We observe in it corpuscles, shaped very like to tadpoles, w^t a roundish & somewhat oval shaped head, & a tail long ly in proportion to it. Now these by their progressive motion, they move w^t rapidity & yt motions they perform, and accompanied

panied w^th vibrations, & bending of y^e. tail
if two corpuscles meet togeither, they turn
side ways, nay y^e. same corpuscle, beyond
a double allows it to course, after running a
certain way forwards, it turns again, so
y^t any one seeing them that y^e. same
belief of their being living animals, y^t
he have on seeing fish more in answer
& I would observe y^t. y^e. History of them
given by Buffon, w^th much seeming
accuracy, is from beginning to end a
mere romance, I deny, y^t there are any
such evolutions, or changes, as he descri
bes, but in y^e. first instant, they appear
y^e. same as in y^e. last, & when in an
hour or two y^e. motion ceases, y^e. corpus
cles are seen, they remain in y^e. liquor
after a longer period they disappear, but
no others come in their place. —
Now tho' I believe that they are living
Animals, yet I cannot imagine y^t
each of these is a Foetus in miniature
y^e. motion is too violent & rapid, y^e.
figure is different, & moreover y^t.

me)

we could not perceive any thing like these my. body of y. female, would not conclude y. y. animal was from y. male. these may, in y. male women, as well animum for them, just as we find eggs in virgin, without supposing y. fecundity of y. virgin depends upon y. coelo. But D. Buffon, if his experiments may be credible, have seen y. very same appearance in y. animum of y. female so y. very foundation of this opinion is not clear, & we must judge from other circumstances, & upon y. whole in the particular genus of animals, in y. Thing I observe y. there are black substances in y. ovarium which perfectly correspond in their colour & general shape wt. y. testicle, & this before conception in very young Virgo, & from this y. idea of Haller y. y. rudiment exists in y. female in this genus receives a full proof, at y. same time if we are to speak in general, & more especially wt. regard to y. first class, I would of y. opinion very greatly, for this plain reason, y. if from accid. experiment

experiment wherein there be any interruption in ye passage leading to ye uterus, or from ye uterus to ye ovarium, there is no conception wch we never observe ye Semen animalis to be wanting in the female, however plenty ye male or in time of heat, a conception arises. Wch there is a resemblance to ye male as well as to ye female in ye fœtus. It might conceive ye rudiment to come from ye male alone, & yt to resemble ye female from ye lodgement & length of time it is connected, but if it come from ye female alone, there is no reason to suppose this circumstance, wch obtains in all kinds of animals, is more remarkable than in others or in different species of ye same Genus engender together and find yt ye fœtus is an perfect mixture of ye two, & I have no doubt ye same thing would happen, wt ever any of ye external senses of ye animal, whether seeing, as horse yt is blind, would produce an ape or Mule, as certainly as one yt sees. Hearing is therefore not

non

von' le la liue that at ye very instant of conception, there is a real impulse of male & female influence, in ye manner we shall never be able to comprehend, but it is as necessary to ye production of a plant, as ye mixture of an Alkali wt an acid, is to produce a neutral. The other circumstances remaining, neede to be mentioned, relative to ye cause of ye Menstrual Flux of women you know, ye Uterus hasse no only during ye continuation of it. Before we enter upon ye cause, let us recollect a few circumstances demonstrated of ye structure, & use of ye most otherwise accurate anatomists, as, Hungarus have given us a description of ye structure of ye uterus, we have found in it's anterior, which is very small & very convoluted, & which at last end by open mouths wt in ye cavity while ye lateral branches from ye artery, communicate wt corresponding veins, & these communications are so small, yt we do not perceive them wt ye naked eye, we likewise find

find branches of veins opening into the cavity &
of the uterus, or we observe a abundance of good
deal more nothing of the corpora cavernosa
or of the penis, or of the clitoris. The circu-
lation may go on between the artery & the
vein without an effusion into the cells
of the penis, but whilst it goes on there
may be an effusion into the cells, & a separa-
ge of the blood from the cells into the veins
. Now this in all we observe in the uterus
for there are no sinuses, such as. Ru
gagni & others have spoke of. They ima
gine that an artery goes into a branch fa-
mily, & that a vein comes out from the cavity
& from the vagina canal, leading to the
Uterine cavity of the uterus, but we can
trace the arteries cylindrical the whole
way, as also the veins.

I have supposed the Menstrual
blood to be venous, & if a violent expan-
tion be made, the blood may be pushed
back from the mouths of the veins into a
branch, & the order of circulation for
a moment inverted, but for ordinary

use

we must conceive y. Menstrual blood to flow from y. extremities of y. arteries, & so it has no receptacle y. it is spun & of y. same kind w.t y. rest of y. circulating mass.

Next let us attend to y. Phenomena, it begins generally in this Island about y. 15 year, it is preceded by a general uneasiness y. body being at y. same time in a state of growth, not yet come to its acme, y. appearance is altered, y. face is changed, they complain of uneasiness in y. breast, of pain in y. back, & have complaints about y. stomach, still later they feel pains & shooting down y. limbs, w.t an uneasy griping pain in y. intestines, & heat about y. region pubis. Here y. flux succeeds, at first more irregular in its appearance, but soon coming to be tolerably regular, & generally happening in every lunar period, about 28 times in y. year ... In many it is preceded, even afterwards, w.t y. symptoms (described) but in y. greater number, these are so very slight, y.t y. flux happens before

before ye person is aware of it, or she is only aware of it a few hours before. In time of ye flux, there are evident marks of languor & debility, ye eye appears hollow & ye face pale, there is a blue colour around ye eye this appearance of languor ceases nearly wt ye flux, & when ye flux is over, there is no symptom of weakness left. Women yt live full, & take little exercise, discharge a much greater quantity of blood than others do, & sometimes ye periods are more frequent. In woman yt is much, ye flux generally ceases, tho there are some instances of women who menstruate & give suck at ye same time, & yt without any bad consequence. Now what cause are we to assign for ye discharge? The frequency of ye periods, corresponding wt ye revolutions of ye moon, gave rise to ye opinion among ye antients, yt ye flux immediately depended upon ye influence of ye body, & now it is not easy for one to reject this, & would acquiesce yt

yt. many men' women menstruate at yt. new & full moon, than at any other period at yt. same time it appears at every period of yt. moon; & yt. we find yt. it is not men struat' wt. many, but happening twice in yt. month, or once in yt. 28 days, there is still some more essential cause. Paired causes yt. are but little attended to, or evidently wanting a proper foundation, as yt. Hon. appetite & ? & Schall studied to state two opinions, which have long divided Physicians. 6

The most antient, & yt. most gen. is yt. M. Slop, in owing to a fulness of yt. blood vessels of yt. body, or to a plethora of yt. whole System; while others imagine yt. yt. cause depends upon a local or uterine plethora, yt. yt. uterus by its structure accumulates wt. yt. blood wt. out yt. rest of yt. body, being primarily & principally affected. 6 Now before saying any thing on either opinion I would observe yt. yt. arguments on either side have been stated among

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It is admitted by Authors as a fact that Men as well as Women are subject to plethora; but I can't believe that nature moves any thing in vain, & I see no ground for supposing that men are disposed to too great a quantity, they have that which is useful to them & no more. But they argue as if our vessels were a mere system of Hydraulic tubes without attending to the powers of motion & the consequences of this. Stopping to the most material arguments, I shall first note stating the objections to the general plethora. They tell us that instead of finding symptoms of plethora, at the time of the flux, there are evid. signs of great debility. Now, if signs of debility never proceeds the first beginning of the flux they only attend it, for as the tumor & oppression are felt, before the menstrual blood is evidently discharged, but if symptoms did not before it has made its way into the cavity of the uterus, which possesses an exquisite sensibility capable of distending it, which accommodates

nomy, & here two circumstances are to be held in view, 1 the effect which it has in an unusual manner tickling down it's nervous surface, & (extending it) it allows in it effect which a fullness any where in it vascular system is apt to bring on, so that we see many have nearly it same languid look whilst blood is flowing from a vein, that it quantity is small, & they themselves not under it smallest apprehension. Next they tell us that it quantity (discharged is not so considerable, as either to produce or remove it bad effects of pleathora, not exceeding 4 l. 6, as I suppose, but we every day in severish (disorders) obtain great relief from telling 4 l. quantity of blood, we are not merely to say we tasted in more drinks, it effect of it drinks & it blood may be opposite, it one may heat & irritate, & it other serve to cool it body. They observe not it it same (discharge) should take place in every female animal but this equally makes against it opp.)

other supposition of y. vital principle, & all
acting thro' its channels of y. proper tone &
conciliency, there is in reality a similarity, tho'
not a real difference, which I remarked
between y. connexion of y. Solar & y. great
Animal, & of y. human body. Next they
tell us y. if there was a general plethora
we would be able to prevent it. True, for many
bad consequences attending y. want of it,
by telling a few ounces of blood. But
this argument will only apply to a Hydraulic
machine, but is not conclusive when
we speak of a living & animated substance
possessing y. powers of our machine, where
y. respiration is in proportion to y. waste.
suppose y. y. effects of y. stimulus have
yielded to y. general push & system is
once vitiated, & thrown into a more violent
action, y. telling a few ounces of
blood from y. arm, is not sufficient
to remove y. action, any more than
y. culling an irritated nerve is sufficient
to remove all y. symptoms, which
y. irritation of y. nerve has produced

&

y^e^ chief y^e^ middle part of y^e^ bl: regularly
flows, y^e^ Menstrual flux comes at y^e^
usual time, for unless an habite evacuation
were otherwise in proportion to y^e^ (crasis) it
would never recover y^e^ loss of substance
& if y^e^ period of y^e^ flux be near, women in
general are averse to y^e^ letting of blood,
because (y^e^ general experience) has proved
y^t^ it is hurtful. Yet we are told y^t^ Jews
were, in whom there is no plethora, no
plethorical people, menstruate very readily
&, how frivol, unsupposing this to be a fact
should we not make allowance for y^e^
general relaxation of parts, which there
takes place, y^e^ uterus has a larger call^r^
than any other organ, & being in a relaxed
state, y^e^ blood readily forces its way thro'
it, still more so in y^e^ Plethorick, when
there is a degree of subsidency in y^e^
humours, & y^e^ whole System is imi-
tated, & we must make allowance
for y^e^ force of habit, which is very
powerful, & in fact y^e^ Menstrual
flux very often ceases in persons y^t^
are

are much reduced & weakened by disease.
In like manner they tell us yt. after a woman
has been delivered, there is a great loss of
blood, & yt that yt. flux soon returns, but
yt. time is more distant, than is allowed
never almost till a month, & more or
2 months, & yt. suppose is rather yt. it
is retain, because yt. habit of body,
ing yt. pregnancy, has constantly prepared
more than is sufficient for itself. They
repl. answer, yt. if yt. Menstrual flux be
obstructed, yt. menses produced gravest
in a few days, or attempt returns a no
after, there is a struggle & uneasiness
for some days, which lasts several,
if it depends upon a general plethora
yt. suppression should increase in equal
(dual. proportion, because yt. blood is
be more accumulated, but yt. weight di-
minishes of yt. body in yt. struggle has
in some measure yt. effect of yt. flux
& to show, yt. such struggles may pro-
ceed from plethora, & go off again, &
again return without any disturbance
if

a person in y^e habit of drawing blood at regular times, he found an uneasiness, which began again, but again returned, & kept they alledge y^e skin plethora (does not answer the purpose, because if but 3, or 4 Ounces of blood are evacuated, y^t in 9 mo^s makes but 45 Oz^s. Now this objection will vanish, when we consider y^e consequences. Supposing y^t y^e full quantity & in due proportion had been discharged each month, there would have been a deficiency in y^e next months, when y^e salus was not able to consume it; an abortion must have taken place, whereas by shutting a medium y^e salus as it enlarges, increases y^e power & y^e Mother in collecting what is wanting. Now as for y^e objection against a general plethora; Next y^e shall endeavour objections against y^e supposition y^t y^e plethora is merely plenine, & y^t y^e rest of y^e body is not affected; & begin w^t observing, y^t y^e very languor admits so much better explanation as y^e former, not suppression; at least there was adopt y^e latter, have taken no manner of

of sparing to lessen ye dispatch, why ye next of
ye body is so much oppressed: Sept how comes
it yt ye flux happens at ye very time ye whole
body is endeavoring in a wonderful manner!
is there not then especial juste upon every
organ, & ye flux commited wth ye velo upon
ye next of ye system? Or how do we explain
ye previous symptoms? for if ye uterine
plethora be natural & needful, why does
yt produce such especial disorder? why
does ye head & ye next distant parts upon
before it appears? Or how does it happen
yt women do not menstruate, or how is
this uterine plethora transferred sometimes
to ye lungs, or to ye nose &c? but I would
bring an argumentum crucis, & very
plain anatomical fact. That there are
no receptacles in ye uterus, for lodging
ye quantity discharged, found not in
ye uterus of women, who have died dur-
ing ye flux any dilatation of ye vessels
nor any place for lodging ye blood, & ye
difference of blood is not sensible, as
cannot exceed ℥1, 3 ß. 5 or 6 oz. must
come

come from ye general System, & they come not
(advantage to ye woman so much blood must
have been contained in her vessels than was
needful. Upon ye whole Changes appearing
in Women and intended to monish for a No
of months, ye Paluo as well as their whole body
their Constitution is filled by nature in a
manner not (dreamt understood, for preserving
more blood & nubritious matter than is
necessary for themselues, hence a necessity
arises ye Cessation of this shall from time
to time be (discharged, & ye Orifice (Mouth)
or mo Fluid ye longer necessary upon ye
cavity of ye uterus, than into any other (ready
serving as an outlet to ye Body. Next ye
Paluo in ye human body is mounted in
a manner proper to it, vessels are pro-
duced, which we may compare to ye vessels
arising from a fresh wound, ye Arteries
cut & wipt ye Paluo of ye womb, or
membranes connected wt ye Paluo
Hence on this acct liberious, no Fluid upon
months of vessels, & as nature is ever
unwilling in compleating her purposes, ye (this
change

charge a mare, & y. fœtus nourished by y.d. vasa' vasa' vasa', & unless y.d. fœtus were supplied to d. vasa' vasa' there by giving way would soon y.d. accumulating of y.d. nourishm.t & y.d. preserving of it in vasa' quant.y in y.d. last mo.s of pregnancy, y.d. full quant.y of blood necess.y is not discharged, but a medium is struck y.d. fœtus being as little able to consume & 0z. in y.d. first mo.s as in d. last, it is able to live upon & cause d. vasa' of y.d. fœtus and enlarged by y.d. vasa' of y.d. mother, by y.d. drain y.d. quant.y is increased then d. vasa' y.t conceived w.t y.d. placenta whereunto y.t. organ stood, come to be y.d. largest, just as in y.d. womb but y.t. end. being of y.d. child, y.d. vasa' fœtus (duely come to be enlarged. As many circumstances in this view, is considered, & y.t. might (doubtful is, whether y.d. uterus is somewhat better calculated by Nature then y.d. accumulating blood than y.d. other organs, y.t. may be y.d. case, but there is no receptacle to contain y.d. q.ty of 5 or 6 Ounces.

9

I have now finished all y^t I proposed in y^e beginning of this Course & that y^e subject I have made it a rule, because I consider it as a duty, to explain myself fully on every subject, w^ch y^e world may regard to y^e more opinion, or authority of authors. I hope you will not think I have endeavoured to do it without proper impartiality, & y^t y^e reader, I have tho^t it incumbent on me to use w^t great warmth I have not been misunderstood. I hope you will not from thinking, y^t I meant to grant out y^e authors as more eminent than others, this is no way from being y^e case) y^t I would wish to recommend them chiefly to your perusal, as y^e eminence they have acquired justly merits. But I tho^t you w^d be more in danger of being misled by them than by others & I wished to convince you of y^e necessity of thinking freely for yourselves on every subject, that so you do so, you will better detect y^e fallacy in reasoning, nor dread y^e force of truth.

Now y^t we are about to part, it is fit to

once for

unnecessary to say any thing as a spur to your future industry, you are surely by this time sufficiently convinced that the profession you have undertaken, considered as a genteel Science, is as pleasing as it is important, & that the application to practice will be often found as difficult & interesting to the patient, and as often all the pains we can take to acquire improvement we are often perplexed with doubts, & hurt with disappointment, & must be accustomed to a steady mind if there is the smallest reason for despairing, if we had been more attentive & enjoyed the proper opportunities, we might have been better enabled to have (discharged) the duties of our Function, But any absence of mind, I shall know, and unnecessary your attention all along, which must chiefly attribute to your own desire of improvement & in a successful success of it. I wish you success in your new undertakings, & if I can contribute to it you will freely let me know, I will always consider such an opportunity as an additional favour

Yours

623(alt)

Really ix + 626 for foll. 50, 482, 483, 511 are double
+ fol. 494-5 = 1 leaf